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AUTHOR Zelenak, John
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ABSTRACT

This competency-based module uses the Ocean County (New Jersey) Vocational-Technical Schools curriculum-infused model for infusing basic skills instruction into vocational education. The model demonstrates the relationship of vocational skills to communication, mathematics, and science. The document begins with a philosophy statement; preface; a table that explains the number of hours required for academic credit in various programs and the number of those hours that are devoted to basic skills and vocational activities; matrices that show in which courses specific basic skills are taught; a list of objectives; and an explanation of student activities. The rest of the document consists of matrices that describe the relationship of vocational skills to basic skills within the commercial photography and television production program. These pages are organized by instructional unit and the topics within them. For each topic and associated task(s) are listed the theories and the communication, math, and science skills covered. Also listed are the expected student outcomes. The 22 units included are: orientaiton; classroom safety; the photographic process; parts of a camera; film exposure; creating an image on paper; film developing; printmaking; print finishing; camera accessories; flash photography; photographic composition; alternative techniques; lighting; advanced negative making; the view camera; color photography; studio considerations; portfolio production; careers in photography; film analysis; and video production. (KC)

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Competency Based Vocational Curricula

COM-LINK

With Basic Skills And Academic Linkages

Dr. Frederick Felice, Project Director

Marilyn Halprin, Co Project Director (Project Coordinator)

In Cooperation With The

New Jersey State Department of Education

Division of Vocational Education

And

Ocean County Vocational-Technical School

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Ocean County Vocational-Technical School

Commercial Photography and Television Production

Prepared by

John Zelenak, Instructor

Project Director
Frederick Felice, Ed. D., Assistant Superintendent

Project Coordinator and Editor
Marilyn Halprin, Supervisor of Basic Studies

Assistant Editor and Typist
Laura Vassallo

Administrative Offices
137 Bey Lea Road
Toms River, New Jersey 08753

William G. Henry, Superintendent

In cooperation with
the New Jersey Department of Education
Division of Vocational Education, Trenton, New Jersey 08625

PHILOSOPHY OF EDUCATION

The Ocean County Vocational-Technical Education Program should consist of those courses, activities and experiences which are designed to prepare students for a successful entrance in a given field of work. The program should be based upon an analysis of the worker needs of the field of work, the opportunities and requirements for entrance, and the particular characteristics and needs of the students.

We believe that:

The school should educate and train the students to live effectively in our ever-changing world.

The school should provide, for each student, intensive training toward general and specific job objectives, and setting standards of performance in keeping with the requirements of that particular field of work.

All students should evidence the interest, aptitude, and ability to profit from the specialized instruction, and this should be a condition of entrance into or continuance in a given field of work.

Equal attention should be given in the school program to develop sound character, good citizenship, ability to think critically, and maintain good mental and physical health.

The school must be constantly striving to fulfill its ultimate purpose; that of serving the students and the community. The school should give careful consideration to the needs, interests, and capacities of the students and the educational and technical background, experience, training, and professional interest of the professional staff as they develop a working philosophy of education.

PREFACE

The curriculum format employed by this project is competency based and utilizes the Ocean County Vocational-Technical Schools' curriculum infused model for the teaching of basic skills as part of vocational education. The design demonstrates the relationship of vocationally related skills to communication, mathematics and science knowledge. Proficiences with regard to student outcomes cannot be achieved without mastery in related academic areas. All student outcome objectives are predicated upon entry level skills which reflect the dictates of the job marketplace and industry. In addition, basic skills matrices developed by the district are included. The totality of this package is designed to facilitate the vocational teaching process and to enchance the learning experiences of our students.

POTENTIAL OPPORTUNITY FOR AWARDING ACADEMIC CREDITS FOR STUDENTS AT OCEAN COUNTY VOCATIONAL-TECHNICAL SCHOOL

450 hours - 1 year course at O.C.V.T.S.
900 hours - 2 year course at O.C.V.T.S.
1000 hours - 2 year Beauty Culture course

120 hours per year needed for 5 credits
60 hours per year needed for 2½ credits

COURSE	TOTAL HOURS	HOURS SPENT ON COMMUNICATION SKILLS	HOURS SPENT ON COMPUTATION SKILLS	HOURS SPENT ON SCIENCE	TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP
AIR CONDITIONING, REFRIGERATION AND HEATING	900	140	120	120	520
AUTO BODY REPAIR	900	130	120	125	525
AUTOMOTIVE MECHANICS	900	150	120	120	510
AUTOMOTIVE AND DIESEL ENGINE REBUILDING	900	216	126	125	433
BEAUTY CULTURE I AND II	1000	240	120	130	515
BUILDING TRADES	900	135	120	130	515
BUSINESS RELATIONS - MEDIA/MODELING	450	200	60	40	150
CHILD CARE AIDE	900	240	120	122	418
COMMERCIAL ART AND PRINTING	900	120	215	75	580
COMMERCIAL BUILDING CONSTRUCTION (MASONRY)	900	130	125	130	515

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COURSE	TOTAL HOURS	HOURS SPENT ON COMMUNICATION SKILLS	HOURS SPENT ON COMPUTATION SKILLS	HOURS SPENT ON SCIENCE	TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP
COMMERCIAL PHOTOGRAPHY & TELEVISION PRODUCTION	900	150	125	80	545
CUSTOM CABINETMAKING	900	130	120	60	590
DENTAL ASSISTING	450	168	65	77	140
DESIGN DRAFTING	900	135	150	165	450
ELECTRICAL TRADES	900	106	120	124	550
FASHION MERCHANDISING	450	200	60	40	150
FOOD SERVICES	900	206	132	125	437
INDUSTRIAL AUTOMATION AND ELECTRONICS	900	129	140	132	499
INTERIOR DESIGN	900	210	130	120	440
LANDSCAPING AND GREENHOUSE TECHNOLOGY	900	125	125	175	475

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900 hours - 2 year course at O.C.V.T.S.
1000 hours - 2 year Beauty Culture course

120 hours per year needed for 5 credits
60 hours per year needed for 2½ credits

COURSE	TOTAL HOURS	HOURS SPENT ON COMMUNICATION SKILLS	HOURS SPENT ON COMPUTATION SKILLS	HOURS SPENT ON SCIENCE	TIME ON OCCUPATIONAL ACTIVITIES IN CLASS OR SHOP
MARINE ENGINE AND BOAT SERVICES	900	164	120	125	491
MEDICAL OFFICE RECEPTIONIST/ASSISTANT	450	173	60	77	140
MEDICAL SKILLS AND RELATED HEALTH CAREERS	450	135	65	125	125
MEDICAL SKILLS (ADVANCED)	450	125	60	125	140
PLUMBING AND HEATING	900	140	120	120	520
RECREATIONAL VEHICLE MAINTENANCE AND REPAIR	900	125	130	60	585
T.V. AND COMPUTER REPAIR	900	125	150	175	450
WELDING	900	135	120	100	545

COMMUNICATION SKILLS

Listed below are all courses offered at the Ocean County Vocational-Technical School.
The asterisk indicates that the topic is studied in that curriculum.

COURSE	Functional Reading Skills	Vocabulary	Identifying Main Ideas	Meanings in Context	Inferences	Fact/Opinion Distinction	Signal Words	Parts of Text-book/Manual	Following Directions	Outlining and Note Taking	Interpretation of Maps Graphs and Charts	Interpretation of Diagrams	Test Taking Skills	Expository Writing Skills	Problem Solving	Spelling	Oral Communications	Study Skills	Resume Writing	Job Application Skills
AIR CONDITIONING, REFRIGERATION AND HEATING	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
AUTO BODY REPAIR	*	*		*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
AUTOMOTIVE MECHANICS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
AUTOMOTIVE AND DIESEL ENGINE REBUILDING	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BEAUTY CULTURE I AND II	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BUILDING TRADES	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL	*	*	*	*	*	*	*	*	*	*	*	*	*	*		*	*	*	*	*
CHILD CARE AIDE	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
COMMERCIAL ART AND PRINTING CAREERS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
COMMERCIAL BUILDING CONSTRUCTION (MASONRY)	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
CUSTOM CABINETMAKING	*	*		*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
DENTAL ASSISTING	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*

COMMUNICATION SKILLS - CONTINUED

COURSE	Functional Reading Skills	Vocabulary	Identifying Main Ideas	Meanings in Context	Inferences	Fact/Opinion Distinction	Signal Words	Parts of Text-book/Manual	Following Directions	Outlining and Note Taking	Interpretation of Maps, Graphs and Charts	Interpretation of Diagrams	Test Taking Skills	Expository Writing Skills	Problem Solving	Spelling	Oral Communications	Study Skills	Resume Writing	Job Application Skills
DESIGN DRAFTING	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
ELECTRICAL TRADES	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
FASHION MERCHANDISING	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
FOOD SERVICES	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
INDUSTRIAL AUTOMATION AND ELECTRONICS	*	*	*		*	*			*	*	*	*	*	*	*	*	*	*	*	*
INTERIOR DESIGN	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
LANDSCAPING AND GREENHOUSE TECHNOLOGY	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
MARINE ENGINE AND BOAT SERVICE	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MEDICAL OFFICE RECEPTIONIST/ASSISTANT	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
MEDICAL SKILLS AND RELATED HEALTH CAREERS	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
MEDICAL SKILLS (ADVANCED)	*	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*	*	*	*
PLUMBING AND HEATING	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
RECREATIONAL VEHICLE MAINTENANCE AND REPAIR	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
T.V. AND COMPUTER REPAIR	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
WELDING	*	*	*			*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

MATHEMATICS SKILLS

Listed below are all courses offered at the Ocean County Vocational-Technical School. The asterisk indicates that the topic is studied in that curriculum.

COURSE	Whole Numbers	Common Fractions	Decimals	Percentages	Weights and Measurements	Ratio and Proportion	Powers and Roots	Formulas	Estimating	Geometry	Basic Trigonometric Functions	Graphs
AIR CONDITIONING, REFRIGERATION AND HEATING	*	*	*	*	*	*	*	*	*	*	*	*
AUTO BODY REPAIR	*	*	*	*	*	*	*	*	*	*		*
AUTOMOTIVE MECHANICS	*	*	*	*	*	*	*	*	*			*
AUTOMOTIVE AND DIESEL ENGINE REBUILDING	*	*	*	*	*	*	*	*	*	*		*
BEAUTY CULTURE I AND II	*	*	*	*	*	*	*	*	*	*	*	*
BUILDING TRADES	*	*	*	*	*	*	*	*	*	*	*	*
BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL	*		*	*		*			*			*
CHILD CARE AIDE	*	*	*	*	*	*		*	*	*	*	*
COMMERCIAL ART AND PRINTING CAREERS	*	*	*	*	*	*		*	*	*		*
COMMERCIAL BUILDING CONSTRUCTION (MASONRY)	*	*	*	*	*	*	*	*	*	*	*	*
COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION	*	*	*	*	*	*	*	*	*	*	*	*
CUSTOM CABINETMAKING	*	*	*	*	*	*	*	*	*	*	*	*
DENTAL ASSISTING	*	*	*	*	*	*		*	*			*

MATHEMATICS SKILLS - CONTINUED

COURSE	Whole Numbers	Common Fractions	Decimals	Percentages	Weights and Measurements	Ratio and Proportion	Powers and Roots	Formulas	Estimating	Geometry	Basic Trigonometric Functions	Graphs
DESIGN DRAFTING	*	*	*	*	*	*		*	*	*	*	*
ELECTRICAL TRADES	*	*	*	*	*	*	*	*	*	*	*	*
FASHION MERCHANDISING	*	*	*	*	*	*		*	*	*		*
FOOD SERVICES	*	*	*	*	*	*		*	*	*		*
INDUSTRIAL AUTOMATION AND ELECTRONICS	*	*	*	*	*	*		*	*	*	*	*
INTERIOR DESIGN	*	*	*	*	*	*		*	*	*		*
LANDSCAPING AND GREENHOUSE TECHNOLOGY	*	*	*	*	*	*		*	*	*	*	*
MARINE ENGINE AND BOAT SERVICE	*	*	*	*	*	*		*			*	*
MEDICAL OFFICE RECEPTIONIST/ASSISTANT	*	*	*	*	*	*	*	*	*	*		*
MEDICAL SKILLS AND RELATED HEALTH CAREERS	*	*	*	*	*	*		*	*	*	*	*
MEDICAL SKILLS (ADVANCED)	*	*	*	*	*	*		*	*	*	*	*
PLUMBING AND HEATING	*	*	*	*	*	*	*	*	*	*	*	*
RECREATIONAL VEHICLE MAINTENANCE AND REPAIR	*	*	*	*	*	*	*	*			*	*
T.V. AND COMPUTER REPAIR	*	*	*	*	*	*	*	*		*	*	*
WELDING	*	*	*	*	*	*		*	*	*	*	*

SCIENCE SKILLS

Listed below are all courses offered at the Ocean County Vocational-Technical School. Those listed as "Not Available" do not offer enough hours to qualify for credits in your high school. However, we have noted the skills covered. Those listed with an asterisk after the title are eligible. The asterisk indicates that the topic is studied in that curriculum.

	HUMAN ANATOMY						ASTRONOMY			CHEMISTRY			PHYSICS					ECOLOGY				
COURSE	Cellular Theory	Skeletal System	Muscles	System of Body	Diseases	Psychology	Solar System	Gravity	Weather	Matter	Chemical Reactions	Applied Chemistry	Light	Magnetism	Heat	Magnetism and Electricity	Nuclear Energy	Botany	Food Production	Fuels	Nutrition	Waste Disposal
AIR CONDITIONING, REFRIGERATION AND HEATING							*	*	*	*	*	*		*	*	*				*	*	
AUTO BODY REPAIR								*	*	*	*	*	*	*	*					*		*
AUTOMOTIVE MECHANICS								*		*	*	*	*	*	*	*				*		
AUTOMOTIVE DIESEL AND ENGINE REBUILDING								*		*	*	*		*	*	*	*			*		*
BEAUTY CULTURE I AND II	*	*	*	*	*	*				*	*	*	*		*	*					*	
BUILDING TRADES							*	*	*	*	*	*	*		*	*		*		*		
BUSINESS RELATIONS - MEDIA/MODELING/TRAVEL	N	* O	* T	* A	V	* A	I	L	A	B	L	E										
CHILD CARE AIDE	*	*	*	*	*	*			*		*	*		*	*			*	*		*	*
COMMERCIAL ART AND PRINTING CAREERS	N	O	T	A	V	A	I	* L	A	* B	* L	* E	*		*	*						*
COMMERCIAL BUILDING CONSTRUCTION (MASONRY)	*	*	*	*	*	*		*	*	*	*	*	*	*	*	*		*		*	*	*
COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION	N	O	T	A	V	* A	I	* L	A	* B	* L	* E	*		*	*						*
CUSTOM CABINETMAKING	* N	O	T	A	V	A	I	* L	A	* B	* L	* E			*			*				
DENTAL ASSISTING	*	*	*	*	*	*				*	*	*	*								*	*

SCIENCE SKILLS - CONTINUED

	HUMAN ANATOMY						ASTRONOMY			CHEMISTRY			PHYSICS					ECOLOGY				
COURSE	Cellular Theory	Skeletal System	Muscles	System of Body	Diseases	Psychology	Solar System	Gravity	Weather	Matter	Chemical Reactions	Applied Chemistry	Light	Magnetism	Heat	Magnetism and Electricity	Nuclear Energy	Botany	Food Production	Fuels	Nutrition	Waste Disposal
DESIGN DRAFTING							*	*	*	*		*	*		*	*	*			*		*
ELECTRICAL TRADES							*	*	*	*	*		*	*	*	*	*		*			
FASHION MERCHANDISING	*	*	*	*		*		*		*	*	*	*								*	
FOOD SERVICES					*	*		*	*		*	*	*		*				*		*	*
INDUSTRIAL AUTOMATION AND ELECTRONICS								*		*			*	*	*	*	*			*		
INTERIOR DESIGN		*	*			*	*	*	*	*	*	*	*		*	*						
LANDSCAPING AND GREENHOUSE TECHNOLOGY							*	*	*		*	*	*		*	*		*	*	*	*	*
MARINE ENGINE AND BOAT SERVICE								*	*	*	*	*	*	*	*	*		*		*		
MEDICAL OFFICE RECEPTIONIST/ASSISTANT	N	* O	* T	* A	* V	* A	I	L	A	B	* L	E										*
MEDICAL SKILLS AND RELATED HEALTH CAREERS	*	*	*	*	*	*		*		*	*					*			*		*	*
MEDICAL SKILLS (ADVANCED)	*	*	*	*	*	*		*		*	*					*			*		*	*
PLUMBING AND HEATING					*		*	*	*	*	*	*			*	*		*		*		*
RECREATIONAL VEHICLE MAINTENANCE AND REPAIR	N	O	T	A	V	A	I	* L	A	* B	* L	* E	*	*	*	*				*		*
T.V. AND COMPUTER REPAIR										*	*	*	*	*	*	*				*		
WELDING								*		*	*	*	*	*	*	*				*		

COURSE OBJECTIVES

1. To prepare students with entry level skills, abilities and knowledge for employment in commercial photography and television production.

2. To present 900 hours of instruction and practice in commercial photography and television production in accordance with the course curriculum and skill profile outline.

3. To provide a detailed summary evaluation of the proficiency achieved by each student representing the most important content areas presented in the commercial photography and television production skill profile.

4. To help each student develop positive attitudes and ideals related to their occupation in commercial photography and television production and understand their own capabilities and potential.

5. To instill in each student the need to plan for their professional growth through continuous learning in their chosen occupation.

STUDENT ACTIVITIES

All students enrolled in the Ocean County Vocational-Technical School are encouraged to join Vocational Industrial Clubs of America (VICA). Student activities are infused into each program. Each building has a student government and a student activities program separate from VICA. Additionally, students from each center and every class are encouraged to participate in the VICA Leadership and Job Demonstration Contests which begin in the centers and radiate throughout the district as Ocean County Vocational-Technical School inter school winners are chosen.

Student activities emphasize the basic precepts of VICA, as well as the basic tenets of democracy. Within the context, each of our programs teaches the dignity of work, high standards in trade ethics and safety, and a belief in the free enterprise economic system.

The Commercial Photography program is further tied into the national arm of VICA in that it provides the on location photography and printing for the National Leadership Conference and United States Skill Olympics on an annual basis. This rather elite "press corps" travels to the National Conference and produces all the public relations, press and industrial photos required by National VICA in portable on location darkrooms. This is the culmination of a student's training in photographing under pressure situations.

TABLE OF CONTENTS

COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION

PHILOSOPHY OF EDUCATION..... i

PREFACE..... ii

POTENTIAL OPPORTUNITY FOR AWARDING ACADEMIC CREDITS..... iii

COMMUNICATION SKILLS..... vi

MATHEMATICS SKILLS..... viii

SCIENCE SKILLS..... x

COURSE OBJECTIVES..... xii

STUDENT ACTIVITIES..... xiii

ORIENTATION..... 1

CLASSROOM SAFETY..... 3

- Tools and Chemicals..... 3

THE PHOTOGRAPHIC PROCESS..... 4

PARTS OF A CAMERA..... 5

- The Camera Body..... 5
- The Camera Shutter..... 6
- The Camera Lens..... 7

FILM EXPOSURE..... 9

- Film Speed..... 9
- Exposure Control..... 11

CREATING AN IMAGE ON PAPER..... 12

- Photograms..... 12

FILM DEVELOPING..... 13

- Chemical Formulation, Mixing and Use..... 13
- Developing the Film..... 15
- Customizing the Negative..... 16

PRINTMAKING..... 17

- Contact Prints..... 17
- Enlargements..... 18
- Photographic Papers..... 19
- Customizing the Print..... 21

PRINT FINISHING..... 23

- Spotting..... 23
- Mounting, Matting and Framing..... 24
- Retouching and Restoration..... 25

CAMERA ACCESSORIES..... 26

- Filters..... 26
- Close-up Equipment and Tele-converters..... 28

FLASH PHOTOGRAPHY..... 29

- Introduction to Types of Flashes and Connections..... 29
- Guide Numbers and Exposure Calculation..... 31
- Operation and Lighting Patterns..... 32

PHOTOGRAPHIC COMPOSITION..... 33

ALTERNATIVE TECHNIQUES..... 34

- Extremely High Contrast Images..... 34
- Solarization..... 35
- Infrared Photography..... 36
- Chromogenic Black and White Film..... 37

LIGHTING..... 38

- Light as a Language..... 38
- Using and Controlling Light..... 39

ADVANCED NEGATIVE MAKING..... 41

- Emulsion and Developer Chemistry..... 41
- Exposing for Minimum Shadow Density..... 42

THE VIEW CAMERA..... 43

COLOR PHOTOGRAPHY..... 46

- Color Vision and Perception..... 46
- Image Structure and Dye Development..... 47
- Negative Developing - Process C41..... 48
- Positive Developing (Color Slides) - Process E6..... 49
- Printing from Negatives..... 50
- Printing from Slides..... 51
- Color Balance..... 52

TABLE OF CONTENTS - CONTINUED
COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION

STUDIO CONSIDERATIONS..... 53
PORTFOLIO PRODUCTION..... 55
CAREERS IN PHOTOGRAPHY..... 56
FILM ANALYSIS..... 57
VIDEO PRODUCTION..... 58
Video Recording and Playback..... 58
Video Editing..... 59

UNIT: ORIENTATION - COMMERCIAL PHOTOGRAPHY AND TELEVISION PRODUCTION

TOPIC:

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. School rules and regulations	A. Student rights and responsibilities B. Student grievance procedures C. Student expectations D. School code of discipline E. Attendance and graduation policy F. Student transfers G. Grading system H. Accidents I. Bedside instruction J. Cooperative Industrial Education (C.I.E.) K. Driving policy L. Drug and alcohol policy M. Early dismissal procedures N. Lockers O. Driver permits P. School closing procedures Q. Smoking R. Student progress reports S. Telephones T. Theft U. Tools and equipment	A. Note taking B. Filling out forms C. Oral communication D. Test taking skills E. Functional reading skills (Student Handbook)			A. The student will know what is expected of him/her for the school year in order to promote effective learning conditions Written test B. The student will know the standards to be met within the school and classroom Written test

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
II. Student contract	A. Attendance policy B. Tardiness C. Points and their implications D. Request for make-up work E. Missing project F. Extra help with assignments or lessons G. Homework assignments H. Requirements for each marking period 1. Shooting assignments 2. In-class assignments 3. Percentage breakdowns I. Grading system - separate reporting system J. Notebook policy K. Contact sheets and negative filing system L. Field trips M. Daily grading system N. Lockers O. Dress code 1. Lab coats 2. Goggles 3. Towels P. Daily cleaning schedule Q. Project submissions R. Costs S. Deadlines for shooting assignments and in-class assignments	A. Note taking B. Filling out forms C. Oral communication D. Test taking skills E. Functional reading skills 1. Student Contract 2. Student Progress Reports			A. The student will know what is expected of him/her for the school year in order to promote effective learning Written test B. The student will know the standards to be met within the school and classroom 1. Oral quiz 2. Written test C. The student will know the submission requirements that govern all the projects within this program 1. Note review 2. Written test

UNIT: CLASSROOM SAFTEY

TOPIC: TOOLS AND CHEMICALS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Utilizing tools and chemicals	A. X-acto knife and razor safety B. Chemical mixing and handling 1. Right-to-Know Law a. absorption b. ingestion c. inhalation d. eye safety 2. Safe handling procedures C. Carcinogens D. Spray Adhesives E. Fixatives and lacquers F. Rubber cement G. Rubber gloves	A. Deductive reasoning Written test B. Vocabulary Identification of chemicals C. Spelling Identification of chemicals D. Functional reading skills 1. Label and precautions 2. Safety handouts 3. Chemical mixing procedures E. Inferencing F. Test taking skills G. Oral communication H. Note taking I. Following directions	A. Ratio and proportion Mixing photochemicals B. Weights and measurement 1. Liquid 2. Dry 3. Linear C. Conversion from American to metric 1. Liquid 2. Linear	A. Acids 1. Definition 2. Safe handling procedures B. Bases 1. Definition 2. Safe handling procedures C. Absorption 1. Definition 2. Protective procedures D. Ingestion 1. Definition 2. Protective procedures E. Inhalation 1. Definition 2. Protective procedures F. Protective devices 1. Rubber gloves 2. Goggles G. Liquid Measurement 1. Ounces 2. Pints 3. Quarts 4. Gallons 5. Liters 6. Milliliters H. Dry measurement 1. Ounces 2. Pounds I. Linear measurement 1. Inches 2. Millimeters	A. The student will be able to demonstrate safe handling procedures of chemicals B. The student will be able to demonstrate safe handling of x-acto knives and razors C. The student will be able to demonstrate a knowledge of safe chemical handling procedures upon written examination D. The student will be able to safely mix photochemicals E. The student will be able to identify potentially hazardous chemicals and solvents by reading label precautions E. The student will be able to demonstrate a basic knowledge of the Right-to-Know Law and the accompanying labeling requirements upon a written test

UNIT: THE PHOTOGRAPHIC PROCESS

TOPIC:

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Forming an image	A. Photographic film 1. Emulsion a. silver halides b. gelatin 2. Base B. Exposure to light 1. Clumping of silver (latent image) 2. Buildup of density (visible image) C. Varying densities 1. Thin (shadows) 2. Dense (highlights) D. Exposure 1. Amount of light (controlled by aperture) 2. Amount of time (controlled by shutter speed) E. Reversing the negative 1. Contact printing 2. Enlarging 3. Exposing the paper a. emulsion characteristics b. Processing to form permanent visible image F. Action of chemicals on film and/or paper 1. Developer 2. Stop bath 3. Fixer 4. Washing aids	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling Vocabulary C. Functional reading skills 1. Class notes 2. Textbook chapter D. Test taking skills E. Oral communications F. Drawing and lettering G. Note taking	A. Ratio and proportion Mixing photographic chemicals B. Whole numbers and fractions 1. Aperture calculations 2. Shutter speed calculations C. Weights and measures 1. Liquid 2. Linear	A. Function of light (physics) B. Emulsion characteristics (chemistry) C. Photosensitive versus Chemical sensitive versus heat sensitive (applied physics and applied chemistry) D. Conversion of silver halides into visible image (applied chemistry) E. Acids versus bases 1. Understanding pH 2. Handling chemistry (applied chemistry)	A. The student will demonstrate a knowledge of the photographic process involving the action of light on film and paper 1. Written test 2. Oral discussion B. The student will draw a chart of the steps involved in the photographic process and label all chemicals and appropriate chemical times Inspection C. The student will demonstrate a knowledge of the vocabulary terms involved in this unit 1. Written test 2. Oral spelling test

UNIT: PARTS OF A CAMERA

TOPIC: THE CAMERA BODY

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identifying camera body parts and functions II. Calculating film surface area III. Identifying image characteristics and film formats	A. Function of camera body 1. Storing film 2. Advances film 3. Provides for viewing and focusing 4. Performs part of the exposure control process B. Classification of camera types 1. Sub-miniature 2. Disc 3. Instamatic 4. 35 millimeter a. rangefinder b. single lens reflex 5. Roll film (medium format) a. single lens reflex b. twin lens reflex 6. Sheet film (large format) a. press cameras b. view cameras 1.1 field 1.2 studio C. Loading and advancing film 1. Camera back 2. Take up spool 3. Pressure plate 4. Film advance lever 5. Rewind knob 6. Free spool button 7. Roll film versus cartridge film D. Viewing and focusing systems 1. Viewfinder 2. Rangefinder 3. Single lens reflex 4. Twin lens reflex 5. View and press cameras	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework assignment D. Test taking skills E. Oral communications F. Drawing and lettering G. Note taking	A. Whole numbers and fractions Linear measurements a. metric b. American c. conversion B. Surfaces and areas Calculating rectangular areas a. metric b. American c. conversion		A. The student shall identify various camera types and list some of their uses Written test B. The student shall draw a diagram of the various film sizes and note all dimensions, both linear and area 1. Observation 2. Inspection C. The student shall demonstrate his/her ability to calculate image sizes (areas) from camera types and film types Written test D. The student shall readily convert from American to metric or vice versa for all linear film sizes Written test E. The student shall readily convert film sizes from millimeters to centimeters or vice versa for all film sizes Written test

UNIT: PARTS OF A CAMERA - CONTINUED

TOPIC: THE CAMERA SHUTTER

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identifying shutter parts and controls II. Controlling motion with the shutter	A. Function of the shutter 1. Controls motion in the image 2. Sets time for exposure B. Types of shutters 1. Leaf - blade 2. Focal plane 3. Electronic versus mechanical C. Shutter speeds 1. Fixed 2. Variable 3. Shutter priorty 4. "Bulb" setting 5. "Time" setting 6. Mathematical relationship between shutter speeds 7. Maximum versus minimum D. Controlling movement 1. Freezing action 2. Blurring action 3. Panning E. The shutter as a function of exposure control F. Reciprocal notation for shutter speeds	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework assignment D. Test taking skills E. Oral communication F. Drawing and lettering G. Note taking	A. Whole numbers and fractions Shutter speed intervals B. Powers and roots 1. Shutter speed intervals 2. Concept of "stops" or "steps" in procedures C. Reciprocals Shutter speed intervals		A. The student shall examine various cameras and identify the type of shutter used in each one 1. Observation 2. Oral quiz B. The student shall chart the entire range of shutter speeds indicating minimums, maximums, and increasing - decreasing notations Observation C. Given a specific verbal description of a photographic situation involving motion, the student shall select the proper shutter speed that will produce the desired effect 1. Oral quiz 2. Written test D. The student shall photograph a variety of subjects that illustrate the shutter's ability to control motion by stopping action, blurring action and blurring background Observation of final photos

UNIT: PARTS OF A CAMERA - CONTINUED

TOPIC: THE CAMERA LENS

Task

I. Identifying lens types and functions

II. Controlling quantity of light

III. Calculating focal distance or focal length

IV. Establishing focal length and image size

V. Controlling depth of field

Theory

A. Lens functions
   1. Image focus
   2. Quantity of light reaching film
   3. Image area
   4. Image depth of field

B. Aperture
   1. F-stops
      a. f-stops intervals
      b. calculating f-stops
      c. relationship to focal length
   2. Preset versus manual versus automatic
   3. Maximum aperture viewing
   4. Aperture priority exposure systems
   5. Aperture as a function of exposure control
   6. Fast versus slow lens

C. Image area
   1. Angle of view
   2. Relation to focal length
   3. Lens types
      a. normal
      b. wide angle
      c. telephoto
      d. zoom
   4. Relationship between focal length and angle of view
   5. Teleconverters
   6. Extension tube or bellows

D. Depth of field
   1. Indentifying depth of field
      a. camera to subject distance
      b. focal length of lens
      c. aperture
   2. Minimum versus maximum depth of field
   3. Selective focus

Communication Skills

A. Vocabulary
   1. Nomenclature
   2. Terminology

B. Spelling
   1. Vocabulary
   2. Written questions
   3. Lab sheets for lens experiment

C. Functional reading skills
   1. Class notes
   2. Textbook chapters
   3. Homework assignment
   4. Lab sheets

D. Test taking skills

E. Oral communications

F. Drawing and lettering

G. Note taking

H. Form completion

Mathematics Skills

A. Geometry

   Ray angles - cone angles as a control in depth of field

B. Linear measurement
   1. Metric
   2. American

C. Surfaces and areas - parts of a circle
   1. Diameter
   2. Radius
   3. Circumference
   4. Area
      a. $D = 2r$
      b. $A = 3.14(r)^2$

D. Powers and roots

   Area of a circle calculations

E. Reciprocals

   F-stop numbers

Science Knowledge

Physics

1. Behavior of light
   a. reflection
   b. refraction
   c. absorption
   d. dispersion
2. Lens optics
   a. circles of confusion
   b. distortion
   c. aberations
      1.1 spherical
      1.2 chromatic
      1.3 astigmatic
   d. curvature of field
   e. vignetting
3. Flare and ghost images
4. Image optics
   a. concave lenses
   b. convex lenses
   c. axis of symmetry

Student Outcome

A. The student shall examine various camera lenses and identify the controls and functions of each one
   1. Observation
   2. Oral quiz

B. Given a metric ruler, a lens, and a piece of cardboard, the student shall measure the lens' focal length.

   Completed lab sheet

C. Given a metric ruler, a lens, and a piece of cardboard, the student shall measure the diameter of the iris diaphragm at each f-stop

   Completed lab sheet

D. The student shall "prove" that each f-stop number is actually a full stop apart using a variety of lenses

   Written test

E. The student shall chart the range of f-numbers; indicating increasing - decreasing directions, and maximum and minimum points

   Observation of chart

F. The student shall demonstrate his/her knowledge of lens optics by drawing projection lines from the original scene through the lens system

   Observation of completed drawing

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	4. Depth of field scale 5. Depth of field preview levers 6. Depth of field charts 7. Zone focusing 8. Hyperfocal distance E. Image making with the lens 1. Axis of symmetry 2. Convergence 3. Divergence 4. Convex lenses 5. Concave lenses 6. Double concave lenses				G. Using a simple meter stick optical bench, a lamp, and lenses of three different focal lengths, the student shall discover the basic relationship between lens focal length, object size, lens to image distance, and lens to object distance Observation H. The student shall demonstrate his/her ability to calculate depth of field using a variety of lenses with depth of field scales Observation I. The student shall construct a series of photographs showing the effect of each of the three factors that control depth of field - photos are to be labeled Observation of photos J. The student shall construct a chart which graphically illustrates what needs to be done to achieve minimum and maximum depth of field - this chart shall have the finished photos attached that were the result of said chart Observation of photos

Task

I. Chooses proper film for a specific situation

II. Readily changes exposure combinations based on changing film speeds

III. Exposes film under a wide variety of lighting situations

Theory

A. Film speed

1. ASA system
2. DIN system
3. ISO system

B. Mathematical relationship

1. ASA
2. DIN

C. Speed versus grain

1. High speed
   a. very low light photography
   b. high action photography
2. Medium speed general purpose films
3. Low speed
   a. high levels of illumination
   b. slow action or no action photography
   c. mural size photography
   d. copy photography
4. Tabular grain films versus conventional films
   a. changing structure of silver crystal
   b. response to light
   c. resultant grain
   d. special exposure techniques
   e. special processing techniques

D. Changing speeds

1. Using higher E.I.'s than published ASA's
2. Using lower E.I.'s than published ASA's
3. Contrast manipulation versus "pushing" film
4. Special purpose developers

Communication Skills

A. Vocabulary

1. Nomenclature
2. Terminology

B. Spelling

1. Vocabulary
2. Written questions
3. Lab sheets for metering

C. Functional reading skills

1. Class notes
2. Textbook chapters
3. Homework assignments
4. Lab sheets

D. Test taking skills

E. Oral communications

F. Drawing and lettering

G. Note taking

H. Form completion

Mathematics Skills

A. Powers and roots - film speed

1. ASA
2. DIN

B. Whole numbers and fractions

1. Film speed
   a. ASA
   b. DIN
2. Numerical relationships between film speeds
3. Changing ASA to different E.I.'s

Science Knowledge

A. Physics

1. Crystals
   a. silver ions - sensitivity to light
   b. bromine ions
   c. photons
      1.1 transfer of energy
      1.2 clumping of free silver ions
2. Tabular grain technology and the grain speed relationship

B. Chemistry

1. Film emulsion characteristics
2. Conversion to free silver

Student Outcome

A. The student shall demonstrate his/her knowledge of the effect of film speed on film exposure

Written test

B. The student shall demonstrate his/her knowledge of the elements of film speed

Written test

C. The student shall chart the relationship between film speed and grain, noting all the key elements

Observation

D. The student will take light meter readings of a variety of lighting situations with both incident and reflected light meters and compare those readings to those arrived at with the in-camera meter; conclusions about the differences between systems will be drawn and a chart showing the results will be prepared

Observation of technique, as well as result

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	E. Measuring light 1. Incident meters 2. Reflected meters 3. 18% gray reading 4. Interpreting results 5. In-camera meters a. spot b. average c. weighted systems 6. Rule of "Basic Full Sun" exposure				E. Using a 35mm camera, the student will take meter readings in full sunlight using the rule of "Basic Full Sun" exposure at at least six different ASA speeds; the results will be used to calibrate that particular in-camera meter Observation F. Using a 35mm camera and incident meter, the student will take readings in a variety of light levels using both the incident meter and the camera with a reflected gray card reading; results will be charted and conclusions drawn Observation

Task

I. Exposes film under a wide variety of lighting situations

II. Handles changing exposure conditions

III. Compensates for failures in film reciprocity

IV. Interprets film curve data and density readings

V. Brackets film as necessary under differing conditions

VI. Analyzes existing lighting conditions and determines proper techniques to record scene on photographic materials

Theory

A. Variables that affect film exposure
   1. Light
      a. footcandles
      b. lumens
      c. electromagnetic spectrum
   2. Film speed
   3. Shutter speed
   4. Aperture

B. Film exposure and reciprocity law
   1. E = I x T
   2. Failure in reciprocity

C. Film exposure curves (H & D curves)
   1. History and overall relationship
   2. ToE, shoulder and d. max
   3. Straight line portion
   4. Logarithms and density
   5. Plotting exposure variables on the curve
      a. useful range of exposure
      b. film latitude
      c. useful range of density
      d. exposure/density errors
   6. Film and gamma
   7. Contrast
   8. Contrast index

D. Bracketing
   1. Over and under
   2. Over only for negatives
   3. Under only for negatives

E. The zone system
   1. Basic concepts
   2. Basic application

F. Putting it all together
   1. Solving real exposure problems
   2. Review of "stops" and "steps"
   3. Innerchanging between variables at will

Communication Skills

A. Vocabulary
   1. Nomenclature
   2. Terminology

B. Spelling
   1. Vocabulary
   2. Written questions
   3. Lab sheets

C. Functional reading skills
   1. Class notes
   2. Textbook chapters
   3. Homework assignments

D. Test taking skills

E. Oral communication

F. Drawing and lettering

G. Note taking skills

H. Graph interpretation

Mathematics Skills

A. Whole numbers and fractions
   1. Film speed
   2. Shutter speed
   3. Aperture

B. Multiplication and division

   Reciprocity law and film exposure - E = I x T

C. Graphs
   1. H & D curves
   2. ToE, shoulder, and d. max
   3. Straight line portion
   4. Interpretation of density
   5. Slope
      a. zero change
      b. Δx versus Δy
      c. plotting a direct proportion

D. Logarithms
   1. Density equals log of opacity $D = \log_{10} Op$
   2. Gamma
      $$\frac{\Delta D}{\Delta \log_E}$$

E. Algebra
   1. E = I x T
   2. Balancing exposure equations
      a. changing conditions
      b. forcing a change

Science Knowledge

Physics - Electromagnetic spectrum
1. Visible light
2. Other forms of energy that affect photography
3. Wavelength
4. Frequency
5. Nanometers
6. Amplitude
7. Wavelength x frequency

Student Outcome

A. Given a series of simulation shooting situations, the student shall make the necessary exposure changes to compensate for the changing conditions
   1. Written test
   2. Observation

B. Given a series of values, the student shall place these on film curves and read the resulting densities from that particular curve

   Observation

C. Given a series of exposure readings, the student shall compute equivalent exposures that result in both the highest and the lowest action stopping combinations
   1. Written test
   2. Observation

D. The student shall expose film under differing lighting conditions and bracket exposures both under and over; results will be recorded and compared to the completed form

   Observation

E. The student will demonstrate his/her knowledge of exposure control and all the factors that contribute to it

   Written test

F. The student shall draw a typical H & D curve with full annotation

   Observation

UNIT: CREATING AN IMAGE ON PAPER

TOPIC: PHOTOGRAMS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Making a photogram	A. Safety review 1. Use of utility knife and x-acto knife 2. Use of scissors B. Designing the photogram 1. Shapes a. enlarging or reducing shapes using a grid b. pantographs 2. Tones C. Exposure 1. Calculating exposure times a. gray scale b. exposure is cumulative c. calculating sequential exposures 2. Pattern positioning 3. Removal of masks 4. Using the enlarger and timer D. Developing the image 1. Paper handling 2. Developing times a. developer b. stop bath c. fixer d. wash 3. Agitation techniques 4. Avoiding contamination E. Print finishing 1. Washing techniques - problems with inproper washing 2. Drying the print a. care of dryer b. dryer safety	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter D. Oral communication E. Drawing and lettering F. Note taking skills	A. Graphing - plotting values on graphs B. Whole numbers and fractions 1. Calculating exposure times 2. Gray scale	A. Physics 1. Action of light on photo-sensitive materials 2. Conversion of silver halides into metallic silver (visible image) 3. Cumulative effect of exposure 4. Levers - using pantographs B. Chemistry - action of photographic chemicals on photographic materials	A. The student will be able to demonstrate safe handling techniques with utility knives, x-acto knives, and scissors Observation B. The student will be able to design a photogram using cartoon-type sketches and enlarging or reducing as necessary Observation C. The student will be able to transfer the design to the cardboard template and cut the pieces out Observation D. The student will be able to calculate the sequence of exposures needed to produce the completed photogram using the gray scale Observation E. The student will be able to expose the paper and develop the photogram Observation

UNIT: FILM DEVELOPING

TOPIC: CHEMICAL FORMULATION, MIXING AND USE

Task

I. Mixing chemicals for black and white film developing including the mixing and preparation of stock solutions from concentrates

II. Labeling chemicals used in the photographic process

III. Interpreting developer usage from constituent reducing agent present in the formula

Theory

A. Developers
   1. Reducing agents
      a. hydroquinone
      b. methylaminophenol sulphate
      c. phenidone
      d. M & Q developers
   2. Buffers
   3. Accelerators and restrainers
   4. Relation to grain
   5. Common developers by Kodak, Ilford, and AGFA
   6. Concentrate versus stock versus working strengths
      a. liquid
      b. crystal (powdered)
      c. ready to use
   7. Properties and uses
   8. Time charts
   9. Mixing and storage
      a. shelf life
      b. safety
      c. labeling

B. Stop baths
   1. Acetic acid
      a. glacial strength
      b. 28% stock
      c. working strength
      d. safety with acids
      e. indicator stop bath - pH indicators
      f. Mixing and storage
         1.1 safety
         1.2 labeling
   2. Running H_2O alternative

Communication Skills

A. Vocabulary
   1. Nomenclature
   2. Terminology

B. Spelling
   1. Vocabulary
   2. Written questions
   3. Homework questions
   4. Written test

C. Functional reading skills
   1. Class notes
   2. Textbook chapter
   3. Homework questions
   4. Chemical data sheets and mixing instructions
   5. Labels

D. Oral communications

E. Test taking skills

F. Note taking skills

G. Graph interpretation

H. Chart and tabular data interpretation

Mathematics Skills

A. Ratio and proportion - mixing photographic chemicals

B. Interpolation - time charts for all chemicals

C. Whole numbers and fractions - processing chart data interpretation

Science Knowledge

Chemistry

1. pH - acids and bases
2. Reducing agents
3. Accelerators
4. Buffers
5. States of matter
   a. liquids
   b. solids
   c. gases
6. Chemical bonding
7. Molecular structure
   a. surface tension
   b. adhesion
8. Solubility
9. Mixing and handling acids
   a. acidity
   b. purity
   c. potency
   d. density
   e. relative strengths of common acids
      1.1 acetic
      1.2 peptic
      1.3 citric
      1.4 lactic
      1.5 hydrochloric
      1.6 sulphuric
      1.7 muriatic
      1.8 hydroflouric

Student Outcome

A. The student will be able to demonstrate his/her knowledge of film developing chemicals; their use, formulation, and storage
   1. Written test
   2. Observation

B. Given the proper mixing utensils, data sheets, and concentrated chemicals, the student will be able to correctly mix the chemicals to either stock or working strength; this shall include, but not be limited to developers, stop baths, fixers, washing aids, and wetting agents

   Observation

C. Given the appropriate labeling devices and data sheets, the student will be able to properly label all the photographic chemicals for safe storage

   Observation

D. The student will be able to demonstrate his/her knowledge of chemical handling and mixing safety
   1. Written test
   2. Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	C. Fixers 1. Purpose 2. Chemical formulation 3. Types a. liquid concentrate b. liquid ready to use c. powdered concentrate 4. Mixing and storage a. safety b. labeling c. shelf life 5. Strengths - proper ratios a. film b. paper 6. Fixing times D. Washing aids 1. Purpose 2. Types a. liquid concentrates b. powdered concentrates 3. Theory of use a. solubility of fixers b. increasing the fixer solubility in H_2O 4. Time 5. Mixing and storage - contamination with paper particles E. Wetting agents 1. Purpose 2. Theory of use a. structure of H_2O molecule b. surface tension or adhesion 3. Practical use 4. Times for use 5. Mixing and storage				

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Loading film onto stainless steel reels II. Using temperature control devices III. Developing 35mm black and white film with stainless steel developing reels and inversion tanks	A. Equipment needed 1. Film reels a. plastic b. stainless steel c. film aprons 2. Bottle opener 3. Scissors 4. Developing tank 5. Thermometer 6. Bottles or other storage containers 7. Graduates 8. Timer 9. Goggles 10. Developing chart 11. Chemicals 12. Negative storage items B. Loading film 1. Using changing bags 2. Using loading rooms 3. Gang loading in darkroom 4. Procedures C. Chemical mixing 1. Mix and prepare all needed chemicals 2. Temperature consistency and control D. Developer/chemical time charts 1. Utilization and interpretation 2. Interpolation of developing times E. The developing process - step by step sequence F. Common developing problems 1. Incorrect chemical formulation 2. Incorrect temperature control 3. Reticulation 4. Loading errors 5. Scratches or chemical streaks 6. Fingerprints	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions 3. Homework questions 4. Written test C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Chemical data sheets and mixing instructions 5. Labels 6. Developing time charts D. Oral communications E. Test taking skills F. Note taking skills - step by step developing procedures G. Chart and tabular data interpretation H. Inferencing - troubleshooting negative faults	A. Ratio and proportion - mixing photographic chemicals B. Interpolation - time chart for developing times C. Whole numbers and fractions - processing time calculations	A. Chemistry - mixing and handling photographic chemicals B. Physics - mechanics of temperature sensing and temperature control devices	A. Given a 35mm stainless steel reel, scissors, bottle opener and 35mm film, the student will be able to load film onto SS reel without any portions of the film touching itself Observation B. The student will be able to ascertain correct developing time from a variety of developer time charts Observation C. Given all the items listed in Theory - Equipment needed list, the student will be able to mix all chemicals for developing film Observation D. The student will be able to adjust temperature of H_2O using temperature control valves so as to maintain consistency in processing temperatures Observation E. The student will be able to develop 35mm black and white film using the step by step chart Observation F. The student will be able to demonstrate knowledge of the terminology associated with film developing, as well as the causes and recognition of processing errors G. The student will be able to chart the step by step procedures for developing film on a notecard in a checklist fashion Observation

UNIT: FILM DEVELOPING - CONTINUED

TOPIC: CUSTOMIZING THE NEGATIVE

Task

I. Increasing or decreasing negative contrast to compensate for exposure variations

II. Underexposing and overdeveloping film to compensate for shooting in very low levels of illumination (pushing film)

III. Customizing film development to accentuate the effect of grain

Theory

A. Contrast
   1. Contrast as a function of lighting ratios
   2. Contrast as a function of development
      a. overdevelopment
      b. underdevelopment
   3. Shifting development times to compensate for lighting conditions
      a. to increase contrast
      b. to decrease contrast

B. Forced development (pushing film)
   1. Techniques
      a. time increase
      b. temperature increase
      c. agitation increase
      d. chemical concentration
      e. high energy developers
   2. Procedure
      a. Percentage increases or decreases
      b. Setting the initial film ISO to new exposure indices
   3. Advantages versus disadvantages

C. Grain
   1. Increasing or enhancing grain
      a. by development techniques
      b. by chemical formulations
      c. by film choice
   2. Decreasing grain
      a. fine grain developers
      b. ultra-fine grain films

D. Reticulation
   1. As a processing error
   2. As a desired effect

Communication Skills

A. Vocabulary
   1. Nomenclature
   2. Terminology

B. Spelling
   1. Vocabulary
   2. Written questions
   3. Homework questions
   4. Written test

C. Functional reading skills
   1. Class notes
   2. Textbook chapter
   3. Homework questions
   4. Chemical data sheets and mixing instructions
   5. Developing time charts
   6. Labels

D. Oral communications

E. Test taking skills

F. Note taking skills

G. Chart and tabular data interpretation

H. Inferencing
   1. Comparisons and contrasts
   2. Advantages and disadvantages

Mathematics Skills

A. Charts and graphs
   1. Chart interpretation and value interpolation
   2. Contrast indices for film/developer combinations

B. Ratio and proportion - mixing photographic chemicals

C. Whole numbers and fractions - processing time calculations

D. Percentages - processing time calculations

Science Knowledge

Chemistry

1. Mixing and handling photographic chemicals
2. Conversion of silver crystals into metallic silver image
   a. effect of time increases
   b. effect of time decreases
3. Reticulation of emulsion due to response to varying temperature

Student Outcome

A. The student will be able to demonstrate his/her knowledge of the terminology and procedures for customizing the negative for contrast, grain and reticulation

   Written test

B. The student will be able to expose a 400ASA/ISO film at EI's of 800, 1600, and 3200; this film will be processed by developer time compensation, as well as by high energy chemicals; prints will be made to compare the results - a chart showing the results, as well as the prints will be made by the student and a written report on the process submitted

   Observation

C. The student will be able to calculate development time increases or decreases for a variety of changing film exposure indices (E.I.)
   1. Observation
   2. Written test

D. The student will be able to expose a 3200ASA/ISO film at EI's of 1600, 3200, 6400 and 12,800; film will be developed and comparisons drawn as in Student Outcome letter "B" above

UNIT: PRINTMAKING

TOPIC: CONTACT PRINTS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Making contact prints	A. Equipment needed 1. Enlarger 2. Timer 3. Contact printer or proofer 4. Safelight 5. Processing trays 6. Print tongs 7. Processing chemicals a. developer b. stop bath c. fixer 8. Resin coated (RC) printing paper 9. Print dryer B. Procedure 1. Cutting negatives in strips 2. Loading negatives for contacting a. in proof printer b. in plastic filing pages 3. Using the enlarger as a light source 4. Exposing the paper a. test strip b. final exposure 5. Processing the print C. Identification, marking and usage of proof sheets D. Enlarged proof sheets	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Labeling and filing C. Functional reading skills 1. Class notes 2. Labels D. Oral communications E. Note taking skills	Whole numbers and fractions 1. Calculating exposure times 2. Equivalent exposure calculations	Chemistry - mixing and handling of photographic chemicals	A. The student will be able to cut negatives, insert in proof prints and make contact prints with no fingerprints or other marks on the negatives Observation B. The student will be able to determine correct exposure time for contact printing by doing a segmented test strip Observation C. The student will be able to mark and file negatives and contact sheets in an acceptable alph-numeric system

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Making photographic enlargements	A. Equipment needed 1. Enlarger 2. Timer 3. Contact printer or proofer 4. Safelight 5. Processing trays 6. Print tongs 7. Processing chemicals a. developer b. stop bath c. fixer 8. Resin coated (RC) printing paper 9. Print dryer 10. Easels a. borderless b. bordered c. adjustable d. two sided - multi-masked e. removable multi-print 11. Grain focuser 12. Appropriate negative carrier 13. Projection print scale B. Procedure 1. The enlarger as a projection source a. dichroic enlarger b. condenser enlarger c. enlarger optics 2. Placing film in negative carrier 3. Composing image a. cropping b. full frame printing 4. Focusing - using grain focuser 5. Determining proper exposure a. bracketed test strip b. projection print scale 6. Exposing the print 7. Processing the print 8. Drying the print	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Labeling C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Step by step procedure sheets D. Oral communication E. Note taking skills F. Discretionary judgement - composing images	Whole numbers and fractions 1. Calculating exposure times 2. Equivalent exposure calculations	A. Chemistry - mixing and handling of photographic chemicals B. Physics - enlargers 1. Dichroic filtration 2. Condenser illumination 3. Optics	A. The student will be able to correctly insert the negative in the negative carrier; compose, focus and print an enlargement Observation B. The student will be able to focus on the grain of a negative using a grain focusing device Observation C. The student will be able to crop from the full frame for the enlargement Observation D. Using negatives shot with compositional errors, the student will be able to crop so as to eliminate as many compositional errors as possible from the final print 1. Observation 2. Comparison E. The student will be able to produce enlargements with or without borders; borders, if present, must be uniform and straight Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Selecting the appropriate photographic paper for a specific task II. Controlling contrast in a print III. Selecting appropriate paper/developer combinations for a specific task	A. Resin coated 1. Polymer coatings 2. Processing advantages 3. Tonal reproduction 4. Processing steps 5. Surfaces and designations 6. Developer incorporated emulsions B. Non-resin coated or fiber based papers 1. Stock thicknesses 2. Processing steps 3. Advantages versus disadvantages 4. Special drying techniques 5. Surfaces and designations C. Variable contrast papers 1. Emulsion structure 2. Safelight precautions 3. Exposure a. to white light b. with dichroic filters c. with variable contrast printing filters 1.1 cc filters 1.2 cp filters 1.3 filter sets 4. Limits of response 5. Identification codes 6. Label data D. Graded contrast papers 1. Emulsion structure 2. Characteristics of exposures 3. Available grades 4. Consistency between different companies E. Image tone 1. Warm toned 2. Cold toned 3. Response to processing chemicals 4. Brown tone	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Labeling 3. Written test C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Product data and use sheets 4. Labels D. Oral communications E. Note taking skills F. Discretionary judgement - selecting papers based on published data sheets G. Test taking skills	Whole numbers and fractions 1. Calculating exposure times 2. Equivalent exposure calculations	A. Chemistry 1. Mixing and handling of photographic chemicals 2. Polymer coatings 3. Multi-emulsion characteristics B. Physics 1. Narrow band safelights 2. Filtered safelights 3. Multi-emulsion response to varying light frequencies	A. The student will be able to demonstrate his/her knowledge of photographic paper choices and their response to light Written test B. The student will be able to make a series of prints of the same negative on a variety of paper types; varying both the surface finish and base weight - a display of the results will be made in chart fashion and appropriate notes added Observation C. The student will be able to make a series of prints from the same negative using papers that exhibit a variety of image tone/base tint characteristics; this series of test prints will be repeated using both cold tone and warm tone paper developers - a chart will be made with all finished prints and notes added Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	F. Base tint 1. White a. cold b. warm 2. Cream G. Special purpose papers 1. Card stock 2. Ultra-thin stock 3. Tinted base stock				

Task

I. Controlling contrast in an enlargement

II. Customizing the final print by burning-in or dodging the image

III. Toning prints to change image color

IV. Toning prints to archival standards

Theory

A. Manipulating the contrast
   1. Variable contrast with paper
      a. range of available contrasts
      b. determing exposure time changes
      c. dichroic versus printing filters
   2. Graded contrast papers - contrast range of paper versus contrast range of negative

B. Dodging
   1. Definition
   2. Uses
   3. Dodging tools
   4. Procedures
   5. Equivalent exposure times
   6. Dodging with selective contrast

C. Burning-in
   1. Definition
   2. Uses
   3. Masks
   4. Procedure
   5. Equivalent exposure times
   6. Burning-in with selective contrast

D. Toning prints
   1. Two bath toners
   2. Single bath toners
   3. Archival toning

E. Archival processing

F. Stabilization printers

G. Continuous batch machine processing

Communication Skills

A. Vocabulary
   1. Nomenclature
   2. Terminology

B. Spelling
   1. Vocabulary
   2. Written test

C. Functional reading skills
   1. Class notes
   2. Textbook chapters
   3. Product data and use sheets
   4. Filter calculators
   5. Labels

D. Oral communications

E. Note taking skills

F. Test taking skills

Mathematics Skills

Whole numbers and fractions

1. Calculating exposure times
2. Equivalent exposure times

Science Knowledge

Chemistry

1. Mixing and handling of photographic chemicals
2. Toners
   a. safety precautions - hydrogen sulfide gas
   b. two bath
   c. single bath
3. Stabilization printing

Student Outcome

A. The student will be able to make a series of prints from the same negative using variable contrast filters and dichroic filtration; prints will be made with white light, 30Y, 70Y, 30M, 70M, 100M, 120M and 150M - finished prints will be mounted and notes added

   Observation

B. The student will be able to make a series of prints from the same negative using #1, #2, #3, #4 and #5 graded contrast papers - finished prints will be mounted and notes added

   Observation

C. The student will be able to correctly use a variable contrast filter calculator and time chart to select exposures for filter changes

   Observation

D. The student will be able to demonstrate proficiency in the theory of contrast control and the other elements of custom printing theory

   Written test

E. The student will be able to correctly burn-in and dodge the appropriate areas of an enlargement - straight prints and manipulated prints will be completed and compared

   Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
					F. The student will be able to tone prints both for image color change, as well as for archival toning Observation G. The student will be able to do enlargements using both dichroic enlargers and condenser enlargers and process those prints in both trays and continuous batch machines Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Spotting minor flaws in a black and white print	A. Supplies needed 1. #000 or smaller artists brush 2. Dyes such as Spotone 3. Mixing tray 4. Water 5. Small pieces of sponge B. Adding dye to cover white or light spots C. Etching to remove dark spots D. Bleaching to lighten dark spots 1. With Spot-Off 2. With farmers reducer 3. Refixing after bleach	A. Vocabulary - terminology B. Spelling - vocabulary C. Functional reading skills 1. Class notes 2. Product data sheets 3. Labels D. Oral communications E. Note taking skills		Chemistry 1. Mixing and handling photographic chemicals 2. Using aniline dye compounds	A. The student will be able to spot light areas in dark backgrounds using both Spotone and pencils Observation B. The student will be able to etch dark spots in a light background Observation C. The student will be able to bleach dark areas in lighter backgrounds and then spot to blend as necessary Observation

UNIT: PRINT FINISHING

TOPIC: MOUNTING, MATTING AND FRAMING

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Positioning photographs II. Mounting photographs III. Cutting overmats IV. Framing photographs	A. Supplies needed 1. Metal ruler 2. Utility knife 3. Pencil 4. Pink eraser 5. Dry mounting press 6. Tacking iron B. Choosing the board 1. Color 2. Weight 3. Surface 4. Quality 5. Size C. Fastening devices 1. Double sided tape 2. Spray adhesives 3. Glass beaded adhesives 4. Adhesive coated carrier sheets 5. Dry mounting tissue D. Positioning photographs 1. Gallery mount 2. Conventional borders E. Fastening photographs 1. Tacking tissue to print 2. Positioning print 3. Tacking tissue to board 4. Sealing with press 5. Temperature control of mounting press F. Cutting overmats 1. Measuring 2. Initial cuts 3. Deepening cuts 4. Backcutting corners 5. Fastening overmat G. Inserting prints in frames H. Applying dust seal	A. Vocabulary - terminology B. Spelling - vocabulary C. Functional reading skills 1. Class notes 2. Mounting material packaging information 3. Labels D. Oral communications E. Note taking skills F. Drawing skills	A. Measurement 1. Laying out and positioning photographs 2. Using a ruler B. Whole numbers and fractions - laying out and positioning photographs	Physics - thermosetting adhesives	A. The student will be able to correctly position photographs on mat board and fasten in position using dry mounting tissues and mounting press Observation B. The student will be able to use alternate methods to dry mounting tissue in order to fasten prints to matboard Observation C. The student will be able to correctly cut over-mats for a mounted photograph and affix in position - this shall be done both with a single overmat and a double overmat Observation D. The student will be able to correctly cut a multi-window overmat for a series of mounted photographs with a variety of shapes - this shall be done both with a single and a double overmat Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Spotting color prints II. Retouching photographs including removing unwanted details from prints such as wrinkles, blemishes, braces, scars, etc. III. Restoration of old photographs	A. Introduction 1. Supplies and equipment a. easel b. work boards c. gloves d. cotton swabs e. facial tissue f. colored pencils g. pastels h. color spotting dyes i. lacquer sprays j. brushes k. etching knives 2. Work space 3. Lighting B. Identifying objectives C. Color fundamentals 1. Complimentary 2. Harmonious 3. Analogous 4. Density 5. Contrast 6. Saturation D. Negative retouching 1. Advantages and disadvantages 2. Light boxes 3. Special supplies 4. Retouching black and white negatives 5. Retouching color negatives E. Color spotting 1. Advantages and disadvantages 2. Wet blending large areas 3. Drybrushing small spots 4. Removing spotting mistakes F. Dry dyes G. Spraying and texturing H. Penciling and pastels I. Specific problems J. Airbrushing K. Photo restoration	A. Vocabulary - terminology B. Spelling - vocabulary C. Functional reading skills 1. Class notes 2. Product data sheets 3. Labels D. Oral communications E. Note taking skills		Biology - anatomy and physiology 1. Perception of color 2. Color vision	A. The student will be able to spot color prints for minor flaws such as dust marks using pencil, pastel and dyes Observation B. The student will be able to perform retouching of color prints for more major problems such as removal of facial blemishes, braces, opening closed eyes, eyeglass glare, wrinkles, etc., using whatever medium is appropriate Observation C. The student will be able to produce copy negatives and workprints for photo restorations Observation

UNIT: CAMERA ACCESSORIES

TOPIC: FILTERS

Task

I. Selecting appropriate filters for contrast control in black and white photography

II. Selecting appropriate filters for color compensation and color balance in color photography

III. Selecting appropriate optical filters and exposure control filters for both color and black and white photography

IV. Selecting and purchasing appropriate filter systems for more advanced camera systems

V. Selecting and using appropriate types of diffusion devices to control image sharpness

Theory

A. Electromagnetic spectrum
   1. Wavelength
   2. Frequency
   3. Long wave radiation
      a. T.V. and radio waves
      b. infared radiation
   4. Short wave radiation
      a. cosmic rays
      b. ultra-violet rays
   5. Visible spectrum - nanometers

B. Laws of geometrical optics - rectilinear propagation
   1. Reflection
      a. specular
      b. diffuse
   2. Absorption
   3. Refraction
      a. incident ray
      b. refracted ray
   4. Dispersion
   5. Diffraction
   6. Polarization

C. Filter density
   1. Opacity
   2. Transparency
   3. Translucency

D. Principles of contrast control
   1. Additive primaries
   2. Portion of light transmitted versus absorbed

E. Contrast filters
   1. Red
   2. Yellow
   3. Orange
   4. Green
   5. Blue
   6. Use of and effects

Communication Skills

A. Vocabulary
   1. Nomenclature
   2. Terminology

B. Spelling
   1. Vocabulary
   2. Written questions
   3. Homework questions
   4. Written test

C. Functional reading skills
   1. Class notes
   2. Textbook chapter
   3. Homework questions
   4. Filter charts
   5. Labels

D. Oral communications

E. Test taking skills

F. Note taking skills

G. Graph interpretation

H. Chart and tabular data interpretation

I. Inferencing skills

   Comparisons and contrasts of photo projects

Mathematics Skills

A. Logarithms
   1. Filter factors
   2. Density computations

B. Whole numbers and fractions
   1. Wavelength
   2. Frequency
   3. Metrication

Science Knowledge

A. Physics - light and optics
   1. Electromagnetic spectrum
   2. Laws of geometrical optics
      a. reflection
      b. absorption
      c. refraction
      d. dispersion
      e. diffraction
      f. polarization
   3. Density
      a. opacity
      b. transparency
      c. translucency
   4. Kelvin scale
   5. Color perception - additive color

B. Biology - anatomy and physiology
   1. Brain - color perception
   2. The eye - color vision

Student Outcome

A. The student will be able to demonstrate his/her knowledge of filters, filter factor and filter use

   Written test

B. Given a simulated lighting situation, the student will be able to select the appropriate filter to use in that given situation
   1. Oral test
   2. Written test

C. The student will be able to expose black and white film using the contrast control filters and the same subject/lighting situation for the entire sequence - completed prints shall be noted and comparisons drawn

   Observation

D. The student will be able to expose color film of a fixed subject/lighting situation both with and without color compensation filters; this experiment shall be carried out with color negative, as well as color slide film - results will be compared and inferences stated in writing
   1. Written evaluation
   2. Observation

E. Using a camera equipped with multi-exposure capability, the student will be able to expose a series of frames using color separation filters with color film; the student shall create

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	F. Color compensation filters 1. Kelvin rating 2. Film balance 3. Correction for various light sources G. Lens protective filters 1. Clear 2. UV 3. Haze 4. Skylight H. Neutral density filters 1. Filter factors 2. Exposure adjustment 3. Using N.D. filters 4. Equating N.D. numbers to exposure step changes I. Optical filters 1. Multi-image 2. Split-image 3. Polarizing filters a. theory of use b. practical application c. exposure compensation 4. Cross screen filters 5. Diffraction grids J. Filter systems 1. Filter holders 2. Mat boxes 3. Cokin system 4. Series type filters 5. Step-up or down rings K. Color separation filters 1. Use and application 2. Special purpose uses L. Diffusion filters 1. Soft focus 2. Fog 3. Diffusers 4. Built in soft focus 5. Variable soft focus 6. Effects of use on contrast 7. Use in camera versus use in enlarger				exposures through each filter on the same frame of film with the camera locked in place - still, moving and combination shots will be made; comparisons of final images will be made Observation I. The student will be able to make a series of photos of a variety of subject/ lighting situations using as many diffusion techniques as is available; comparisons will be drawn upon examining the final prints Observation

Task

I. Selection and use of close-up attachments and devices

II. Selection and use of macro and macro zoom lenses

III. Selection and use of tele-converters

Theory

A. Close-up lenses
   1. Macro focusing
   2. Close focusing
   3. Macro zooms

B. Close-up filters
   1. Diopters
   2. Alone or in combination
   3. Depth of field restrictions

C. Extension tubes
   1. Use
      a. theoretical
      b. practical
   2. Depth of field restrictions
   3. Exposure compensation

D. Bellows
   1. Attachment
   2. Types
   3. Mounting on tripod
   4. Depth of field restrictions
   5. Exposure compensation - Formula =

$$\frac{(\text{Focal Length})^2}{(\text{Bellows Length})^2} = \frac{\text{Metered S/S}}{\text{Corrected S/S}}$$

E. Tripods and monopods

F. Cable release

G. Tele-converters
   1. Changing effective focal length
   2. Optical theory
      a. loss of image quality
      b. cost of product versus loss of quality
   3. Exposure compensation
   4. Depth of field considerations

Communication Skills

A. Vocabulary
   1. Nomenclature
   2. Terminology

B. Spelling
   1. Vocabulary
   2. Written questions
   3. Homework questions
   4. Written test

C. Functional reading skills
   1. Class notes
   2. Textbook chapter
   3. Homework questions
   4. Depth of field charts and tables

D. Oral communications

E. Test taking skills

F. Note taking skills

G. Graph interpretation

H. Chart and tabular data interpretation

Mathematics Skills

Ratio and proportion

Solving exposure increases with bellows

$$\frac{(FL)^2}{(BL)^2} = \frac{\text{Indic. S/S}}{\text{Correc S/S}}$$

Where

FL = Focal length
BL = Bellows length
Indic. S/S = Shutter speed as metered
Correc S/S = New shutter speed

Science Knowledge

Physics - optics

1. Focal length
2. Bellows
3. Tele-converters - optically changing effective focal lengths
4. Image optics with extension tubes
5. Diopters

Student Outcome

A. The student will be able to demonstrate his/her knowledge of close-up devices and accessories including tele-converters

   Written test

B. The student will be able to make a series of exposures using close-up filters, extension tubes, bellows and macro lenses; comparisons of results will be made upon examination of completed photos

   Observation

C. The student will be able to make a series of exposures of a fixed subject/lighting situation using both tele-converters and telephoto lenses; comparisons of results will be made upon examination of completed photos

   Observation

UNIT: FLASH PHOTOGRAPHY

TOPIC: INTRODUCTION TO TYPES OF FLASHES AND CONNECTIONS

Task

I. Choosing correct shutter speed for specific photographic results

II. Comparing features and purchasing flash units and systems

III. Connecting flash units and flash systems to the camera

87

Theory

A. Shutter considerations

1. Focal plane shutter
2. Leaf shutter
3. Effect of using higher shutter speeds than that which camera is synced at
   a. with high ambient light levels
   b. with low ambient light levels
4. Effect of using lower shutter speeds than that which camera is synced at
   a. with high ambient light levels
   b. with low ambient light levels

B. Types of flash

1. Flash bulbs
2. Flash cubes, bars and self priming magi-cubes - effective distances
3. Electronic flash units
   a. on camera
      1.1 manual
      1.2 automatic
      1.3 dedicated
   b. handle mounted
   c. AC operated
      1.1 slave driven
      1.2 camera triggered
      1.3 radio controlled
   d. studio flash units
      1.1 self contained
         a.a advantages versus disadvantages
         a.b costs
         a.c availability
         a.d systems approach

Communication Skills

A. Vocabulary

1. Nomenclature
2. Terminology

B. Spelling

1. Vocabulary
2. Written questions
3. Homework questions
4. Written test

C. Functional reading skills

1. Class notes
2. Textbook chapter
3. Homework questions
4. Flash tables
5. Flash unit charts and control dials

D. Oral communications

E. Test taking skills

F. Note taking skills

G. Graph interpretation

H. Chart and tabular data interpretation

I. Inferencing skills

Comparisons of flash unit designs and features

Mathematics Skills

Whole numbers and fractions - calculating exposure

Science Knowledge

Physics - electricity

1. Flow of current
2. Circuits
3. Open versus closed switches
4. Grounding

Student Outcome

A. The student will be able to demonstrate his/her knowledge of flash photography theory, design and utilization

Written test

B. Using a leaf shuttered camera, the student will be able to make a series of exposures of a fixed subject/lighting situation in which the shutter speed is changed across the entire range of speeds; comparisons are to be made upon examination of completed photographs - this exercise shall be carried out in high ambient light, as well as low ambient light

Observation

C. The student will be able to repeat the above experiment using a focal plane shuttered camera; conclusions drawn upon examination of completed photographs

Observation

D. The student will be able to draw diagrams of the contact layout of at least six different popular cameras' hot shoes; compare the locations of similar contacts and label those used for firing versus dedicated purposes

83

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	1.2 power pack operated a.a advantages versus disadvantages a.b costs a.c availability a.d systems approach a.e portability a.f safe handling e. connection to camera 1.1 hot shoes a.a dedicated contacts a.b firing contacts 1.2 accessory shoes a.a use a.b methods of connecting to camera 1.3 cord connection a.a on cameras with PC terminals a.b on hot shoe type cameras - special cords				

UNIT: FLASH PHOTOGRAPHY - CONTINUED

TOPIC: GUIDE NUMBERS AND EXPOSURE CALCULATION

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Establishing guide numbers II. Calculating exposure using guide numbers III. Deciding watt second output for given flash situations	A. Guide numbers 1. Definition 2. Utilization 3. Establishing guide numbers a. by manufacturer b. for individual camera/flash/film combination c. reliability of guide numbers B. Calculating f-stop with a known guide number Formula: $\frac{GN}{DIST} = f\text{-stop}$ C. Changing guide numbers for various ISO speeds D. Calculating guide number from flash unit with unpublished GN tables E. Comparison of different flash units by guide numbers F. Guide numbers versus watt seconds versus BCPS (beam candle power seconds)	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions 3. Homework questions 4. Written test C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Flash tables 5. Guide number charts D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions 1. Guide numbers 2. Watt second calculations B. Multiplication - guide number calculations	Physics 1. Inverse square law 2. Footcandles 3. Candlepower 4. Ohms law	A. The student will be able to expose a roll of film at ASA 100 using a flash to subject distance of 10 feet; the subject will hold cards corresponding to the actual aperture being used, which will run the entire range of the lens; upon examination of the processed film, the student shall select the frame with the best density and compare this calculated guide number with the published guide number Observation B. Given a series of different ASA speeds, the student will be able to readily change guide numbers for each of the new speeds knowing only partial information for one guide number Observation C. The student will be able to calculate guide numbers from a flash unit without published guide number tables D. The student will be able to compare flash units by examining guide number statistics to determine "best buys" Observation

TOPIC: OPERATION AND LIGHTING PATTERNS

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Using flash units and flash systems for shooting a variety of situations II. Calculating exposures using bounce and remote features III. Calculating exposure using flash meters	A. Theory of operation 1. Capacitive discharge 2. Power supplies 3. Discharge tubes 4. Quench tubes 5. Ready lights B. Circuit diagrams 1. Manual flash units a. advantages versus disadvantages b. design updates 2. Automatic units with quench tubes a. advantages versus disadvantages b. design updates 3. Thyrister circuitry C. Flash accessories D. Lighting patterns 1. Single flash a. direct b. bounce c. angle of coverage d. zoom flashes 2. Multiple flash a. simple slaves b. studio lighting 3. Flash meters a. use b. interpretation of data	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions 3. Homework 4. Written test C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Flash tables 5. Guide number charts D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions 1. Calculating exposure 2. Measuring distances for bounce flash B. Interpolation - using flash meters	Physics 1. Electronics a. capacitors b. diodes c. capacitive discharge 2. Law of conservation of energy - quench tubes	A. The student will be able to demonstrate his/her knowledge of the electronic theory of flash operation Written test B. The student will be able to draw the circuit diagrams for the three types of flash units with complete notes Observation C. The student will be able to readily set-up flash units in the studio using plan view diagrams Observation D. The student will be able to readily diagram a plan view of a multi-flash studio set-up with notes on distances and power outputs for each light source Observation E. The student will be able to calculate exposure with multi-flash systems using flash meters

TOPIC:

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Composing images that communicate effectively, as well as aesthetically	A. Expressing ideas 1. Composition as language in visual arts 2. Controlling order to achieve clear communications 3. Compositional controls 4. Making a statement B. Graphic controls 1. "Rule" of thirds 2. Balance 3. Harmony 4. Use of lines a. real lines b. psychological lines 5. Borders 6. Mergers 7. Shape and form as subject 8. Pattern and repitition 9. Fragmentation 10. Horizon line placement C. Photographic controls 1. Light quantity versus quality 2. Lens perspective 3. Choice of film 4. Distortion 5. Selective focus 6. Contrast 7. Tonal distribution 8. Motion 9. Grain of film D. Color controls 1. Film 2. Color distortion 3. Physical/emotional response to color 4. Saturation - effect of exposure 5. Color as the subject 6. Color balance	A. Vocabulary - terminology B. Spelling 1. Vocabulary 2. Written test 3. Class notes C. Functional reading skills 1. Class notes 2. Textbook and reprints from reference books 3. Homework assignments a. essay on composition b. essay on aesthetics D. Oral communications E. Test taking skills F. Critiquing 1. Others work 2. Students' own work			A. The student will be able to demonstrate his/her competence in the rules of compositional techniques Written test B. The student will be able to prepare a series of photographs that illustrate each of the graphic controls, photographic controls and color controls; these photos shall be printed and mounted for display Observation C. The student will be able to critique a variety of photographs using all the compositional techniques mentioned above Oral discussion

UNIT: ALTERNATIVE TECHNIQUES

TOPIC: EXTREMELY HIGH CONTRAST IMAGES

Task

I. Using Kodalith orthochromatic film in the camera for copy photography

II. Using Kodalith orthochromatic as a darkroom special effect film

III. Opaquing litho films

IV. Processing litho film in various developers to achieve specific results

Theory

A. Introduction
   1. Review of panchromatic versus orthochromatic films
   2. Continuous tone versus litho films
   3. Modifications to H & D curve with litho film
   4. Uses of litho film
      a. printing industry
      b. line and copy shots
      c. in-camera use
      d. darkroom special effects

B. Techniques
   1. Introduction to line
   2. Introduction to Kodalith
   3. Making "positive" and "negative" prints
   4. Registering Kodaliths
   5. Line drawing prints with Kodalith
   6. Tonal separation (posterization)
   7. Printing posterizations in black and white
   8. Printing posterizations in color
   9. Multiple image lithos
   10. Combination litho/ continuous tone images
      a. in black and white
      b. in color
   11. Opaquing

C. Necessary supplies

D. Exposing film

E. Processing film
   1. In conventional developers
   2. In Kodalith fine line developer

Communication Skills

A. Vocabulary
   1. Nomenclature
   2. Terminology

B. Spelling
   1. Vocabulary
   2. Written questions
   3. Homework questions
   4. Written test

C. Functional reading skills
   1. Class notes
   2. Textbook chapter
   3. Homework questions
   4. Film packaging instructions
   5. Step-by-step procedures
   6. Labels

D. Oral communications

E. Test taking skills

F. Note taking skills

G. Graph interpretation

H. Chart and tabular data interpretation

Mathematics Skills

A. Logarithms
   1. Density on curve
   2. Sensitometry

B. Whole numbers and fractions - computing exposure times

C. Interpolation
   1. Developing time calculations
   2. Graph interpretation

Science Knowledge

A. Physics
   1. Exposure of litho film to light
   2. Conversion of silver halides to visible image
   3. Response of ortho-chromatic film to light versus response of panchromatic film to light

B. Chemistry - mixing and handling photographic chemicals

Student Outcome

A. The student will be able to demonstrate his/her knowledge of the processes and terminology associated with all aspects of work with litho films

   Written test

B. The student will be able to prepare a litho positive from a continuous tone negative and contact print to produce a negative high contrast print

   Observation

C. The student will be able to prepare a litho negative from a litho positive by the contact method, as well as projection method

   Observation

D. The student will be able to combine litho positives and litho negatives to produce tone line effects

   Observation

E. The student will be able to readily opaque litho film

   Observation

F. The student will be able to prepare the appropriate registered lithos needed to print a black and white posterization image

   Observation

G. The student will be able to prepare a multi-image litho using one litho and at least three separate images

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Solarizing images from continuous tone negatives with both conventional and solarizing developers II. Solarizing litho negatives	A. Description 1. Sabatier effect 2. Mackie lines 3. Degrees of solarization B. Procedure 1. Developer dilution 2. Selecting suitable negative 3. Calculating exposure time - preparing matrix a. initial exposure sequences b. re-exposure sequences 4. Solarizing the image C. Solarizing with special chemicals D. Negative solarization 1. Litho preparation 2. Calculating correct exposure/re-exposure times 3. Solarizing the litho 4. Printing the solarized litho	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions 3. Homework questions 4. Written test C. Functional reading skills 1. Class notes 2. Homework questions 3. Chemical mixing instructions 4. Step-by-step procedures 5. Labels D. Oral communications E. Test taking skills F. Note taking skills G. Chart and tabular data interpretation	Whole numbers and fractions - computing exposure times	A. Chemistry - mixing and handling photographic chemicals B. Physics - sabatier effect 1. On paper 2. On film	A. The student will be able to demonstrate his/her knowledge of solarization techniques and procedures Written test B. The student will be able to prepare a matrix for determining correct exposure and re-exposure times and using that matrix shall solarize a print Observation C. The student will be able to prepare a solarized litho and print from that solarized image by projection onto paper Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Loading infrared film into 35mm cameras in total darkness II. Using black and white infrared film III. Using color infrared film IV. Developing black and white infrared film	A. Review of electromagnetic spectrum - location of infrared bands B. Special handling of film 1. Loading film in camera 2. Exposing images 3. Unloading film from camera 4. Estar base film handling 5. Loading onto stainless steel reels 6. Special focusing techniques C. Exposure 1. Color 2. Black and white 3. Appropriate E.I. 4. Filters used 5. Special purpose uses with visually opaque filters (thermography) D. Processing 1. Color (process E6) 2. Black and white E. Expectations and applications	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions 3. Homework questions 4. Written test C. Functional reading skills 1. Class notes 2. Homework questions 3. Film data sheets 4. Labels D. Oral communications E. Test taking skills F. Note taking skills G. Chart and tabular data interpretation	Whole numbers and fractions - computing developing times	A. Chemistry - mixing and handling photographic chemicals B. Physics 1. Electromagnetic spectrum a. visible light b. infrared radiation 2. Thermography	A. The student will be able to demonstrate his/her knowledge of the use, technique, handling and application of infrared films - both black and white and color Written test B. The student will be able to load infrared film into a 35mm camera in total darkness and unload from the camera onto stainless steel reels also in total darkness Observation of completed task C. The student will be able to expose both color and black and white infrared films using a variety of filters and exposure indices Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Exposing chromogenic black and white film II. Processing chromogenic black and white film	A. Description and uses - alternate process to silver image B. Image structure 1. Silver halides 2. Color couplers 3. Dye formation 4. Bleaching silver 5. Dyed image C. Exposure D. Development 1. Special purpose chemicals 2. Process C41 compatible a. developer 1.1 temperature 1.2 agitation 1.3 mixing b. bleach 1.1 temperature 1.2 agitation 1.3 mixing c. fixer 1.1 temperature 1.2 agitation 1.3 mixing d. stabilizer 1.1 temperature 1.2 agitation 1.3 mixing e. development times f. handling precautions	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions 3. Homework questions 4. Written test C. Functional reading skills 1. Class notes 2. Homework questions 3. Film data sheets 4. Developer mixing instructions 5. Labels D. Oral communications E. Test taking skills F. Note taking skills G. Chart and tabular data interpretation	Whole numbers and fractions - computing development times	Chemistry 1. Mixing and handling photographic chemicals 2. Conversion of silver halides to metallic silver versus aniline dyed images 3. Color couplers 4. Color developers 5. Dye development 6. E.D.T.A. bleaches 7. Silver destruction 8. Stabilizer precautions a. methanol b. formaldehyde	A. The student will be able to demonstrate his/her knowledge of the use, application and theory of chromogenic black and white films and processes Written test B. The student will be able to expose and develop chromogenic black and white film Observation C. The student will be able to mix the chemicals used to develop chromogenic black and white film Observation

UNIT: LIGHTING

TOPIC: LIGHT AS A LANGUAGE

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Defining light as a tool of visual imagery II. Identifying the structure of the language of light	A. Vocabulary of light 1. Six terms to define visual quality of light a. brightness b. color c. contrast d. specular e. diffuse f. direction 2. Two categories of light quality a. comparative category 1.1 brightness 1.2 color 1.3 contrast b. formative category 1.1 specular 1.2 diffuse 1.3 direction 3. Brightness a. brightness key b. literal brightness quality 4. Color a. neutral color balance b. color effects c. color temperature 5. Contrast a. light ratio b. ambient light c. total and local contrast 6. Specular and diffuse a. sources b. surfaces c. interaction 7. Direction - interaction with other qualities B. Light/shade relationship - quantity versus quality	A. Vocabulary - terminology B. Spelling 1. Vocabulary 2. Written test C. Functional reading skills 1. Class notes 2. Reference book reprints D. Oral communications E. Test taking skills F. Note taking skills	A. Whole numbers and fractions - measuring light levels B. Ratio and proportion - establishing lighting ratios	Physics - behavior and definition of light	The student will be able to demonstrate his/her knowledge of the terminology associated with the language of light Written test

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identifying lighting direction and associated results II. Using umbrellas, diffusion flats, snoots and fresnel lenses to control light III. Tailoring lighting direction, quality, quantity and color to specific photographic situations IV. Maintaining control over the quality of light V. Lighting portraits with studio lighting equipment	A. Ambient versus artificial light 1. Lighting directions a. front b. side c. top d. bottom e. back f. fill 2. Maintaining believability with artificial light sources 3. Measuring light B. Lighting equipment 1. Sources a. daylight as a light source b. flash as a light source c. tungsten as a light source 2. Modifiers a. diffusion devices b. concentration devices c. reflecting devices d. supporting devices C. Using light 1. Exposure meters revisted 2. Emphasizing shape 3. Showing form and weight 4. Revealing texture 5. Controlling reflections 6. Lighting transparent objects 7. Balancing color 8. Eliminating flare 9. Creating atmosphere	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions 3. Homework questions 4. Written test C. Functional reading skills 1. Class notes 2. Reference book reprints 3. Textbook chapter D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation	Whole numbers and fractions 1. Measuring light levels 2. Measuring linear distances	Physics 1. Behavior and definition of light 2. Electricity - Ohms law - circuit calculations Amps = Volts x Watts	A. The student will be able to demonstrate his/her knowledge of light direction, measurement, equipment and distribution systems Written test B. Using geometric shapes, the student will be able to make a series of photographs depicting lighting direction; notes will be added to the final prints and a display made of all work Observation C. The student will be able to readily draw lighting diagrams from measuring studio demonstration set-ups Observation D. The student will be able to readily set-up lighting devices in the studio using lighting diagrams Observation E. The student will be able to use main, fill, hair and background lights in studio portraiture Observation

UNIT: LIGHTING - CONTINUED

TOPIC: USING AND CONTROLLING LIGHT - CONTINUED

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	D. Controlling light quality 1. Controlling specular - diffuse quality 2. Controlling color quality 3. Controlling directional quality 4. Controlling contrast quality 5. Controlling brightness quality E. Portrait lighting 1. Main light 2. Fill light 3. Back light/hair light 4. Background light 5. Soft boxes 6. Umbrellas and reflectors 7. Scrims and gobos 8. Patterns a. broad lighting b. short lighting c. butterfly lighting F. On-location packages 1. Flash units a. self contained b. power pack driven 2. Tungsten 3. Power requirements				F. The student will be able to create a series of studio portraits using all devices and techniques at his/her disposal; these photographs will be mounted and exposure/ lighting information placed on the back of the boards 1. Observation 2. Critiquing G. The student will be able to readily calculate the power requirements per circuit for on-location situations 1. Simulations 2. Written test

UNIT: ADVANCED NEGATIVE MAKING

TOPIC: EMULSION AND DEVELOPER CHEMISTRY

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Formulating custom developers	A. Emulsion chemistry 1. The halides a. silver chloride b. silver bromide c. silver iodide 2. Manufacturing a. precipitation - $AgNO_3 + KBr = AgBR + KNO_3$ b. ripening c. washing d. digestion e. coating B. Developer chemistry 1. Reducing agents 2. Solvents 3. Activators or accelerators 4. Preservatives 5. Restrainers or retarders 6. Custom fabricated chemistry a. measuring by weight 1.1 using chemical balance 1.2 grams, cubic centimeters and milliliters 1.3 accuracy b. proprietary products	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions 3. Homework questions 4. Written tests C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Chemical formulas 5. Recipes (developer) 6. Labels D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Metrication 1. Grams/ounces 2. Cubic centimeters 3. Milliliters B. Weights and measures - measuring photographic chemicals	Chemistry 1. The halogen family a. chlorides b. bromides c. iodides 2. Photographic emulsion making - double decomposition reactions 3. Solubility - solvents 4. States of matter 5. Precipitates	A. The student will be able to demonstrate his/her knowledge of emulsion and development chemistry Written test B. Using a developer formula, chemicals, balance scale and appropriate tools, the student will be able to mix developers by custom formula Observation

UNIT: ADVANCED NEGATIVE MAKING - CONTINUED

TOPIC: EXPOSING FOR MINIMUM SHADOW DENSITY

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Using substitute metering techniques II. Metering with 18% gray cards III. Using incident light meters IV. Changing film's E.I. to specific lighting situations	A. Exposure 1. Highlight/shadow relationship 2. Metering highlights 3. Metering shadows 4. Subject brightness range 5. Gray card metering 6. Effects of exposure on density 7. Effects of development on density 8. Matrix of exposure/development 9. Bracketing 10. Substitute metering 11. Incident meters B. Development 1. Overdeveloping a. when pushing film b. when changing contrast 2. Underdevelopment - when changing contrast 3. Development by inspection 4. Development to achieve proper contrast C. Tailoring the film's E.I. to the lighting conditions D. Customizing development	A. Vocabulary 1. Terminology 2. Nomenclature B. Spelling 1. Vocabulary 2. Written questions 3. Homework questions 4. Written test C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Development charts D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions - calculating development times B. Percentages - developing time increases and decreases by percentage	A. Chemistry - mixing and handling photographic chemicals B. Physics 1. Behavior and definition of light 2. Exposure meters a. reflective b. incident	A. The student will be able to demonstrate his/her knowledge of exposure/development functions of advanced negative making Written test B. The student will be able to readily use hand held meters, both incident and reflected; readings taken with reflected meters using 18% gray cards shall be compared to incident readings in a variety of situations Observation C. The student will be able to readily develop film that has had its E.I. changed to suit the lighting conditions Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identifying camera parts and functions II. Determining range of image correction based upon independent movement of constituent parts III. Applying the Scheimpflug rule to adjust plane of focus	A. Types of cameras 1. Flatbed cameras 2. Press cameras 3. Monorail cameras B. Camera parts 1. Rail or support 2. Front with lens and board 3. Camera back 4. Bellows a. accordian b. bag 5. Front and rear standards 6. Ground glass 7. Tripod mount C. Formats 1. 4 x 5 2. 5 x 7 3. 8 x 10 4. Reducing backs 5. Polaroid backs 6. Roll film backs 7. Lens adaptations D. View camera movements 1. Changing distance between lens and film a. by moving front standard b. by moving rear standard 2. Lowering and raising the front and rear standards 3. Laterally shifting the front and rear standards 4. Tilting and swinging the rear standard 5. Tilting and swinging the front standard 6. Plane of focus a. long plane of focus versus depth of field b. convergence of planes of subject, film and lens c. Scheimpflug rule	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Reference book reprints 4. Homework questions 5. Sheet film processing instructions 6. Labels D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions 1. Linear measurement of bellows length 2. Linear measurement of lens to subject distances 3. Exposure calculations B. Multiplication and division 1. Bellows factor calculations $\frac{(\text{Bellows length})^2}{(\text{Focal length})^2} = \text{Bellows Factor}$ 2. Area of film for different formats a. in square inches b. in square millimeters C. Metrication Conversion of metric dimensions to English dimensions - lens focal length in millimeters converted to inches D. Geometry 1. Angles of view 2. Angles of lens coverage for different formats E. Interpolation 1. Exposure calculations 2. Reciprocity changes 3. Bellows factor changes	A. Physics 1. Image formation a. camera obscura b. pinhole cameras c. lenses and optics 2. Scheimpflug rule of converging planes 3. Inverse square law a. bellows extension factors b. exposure increases 4. Reciprocity law of exposure B. Chemistry - mixing and handling photographic chemicals	A. The student will be able to demonstrate a knowledge of view camera terminology, techniques, film types and uses Written test B. The student will be able to set up the view camera, zero all movements and make ready for exposing film Observation C. The student will be able to correctly load film holders Observation D. The student will be able to identify the parts of the view camera that are responsible for all the image correction movements 1. Observation 2. Written test E. The student will be able to draw a cross sectional sketch showing the three converging planes upon which the Scheimpflug rule is based; this sketch shall be completely annotated Observation F. The student will be able to shift the lens and/or film planes to increase the plane of focus using the Scheimpflug rule Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
IV. Creating an image with the view camera and exposing film	E. Forming the image 1. Camera obscura 2. Pinhole camera 3. Lenses and image formation 4. Circles of confusion 5. Angle of view 6. Covering power 7. Controlling sharpness 8. Choosing a lens a. wide-field lenses b. portrait lenses c. soft focus lenses d. convertible lenses e. supplementary lenses				G. The student will be able to readily calculate bellows extension factors and apply them to exposure changes 1. Observation 2. Written test H. The student will be able to readily calculate exposure increases using an exposure calculator similar to the Calumet "2 inch rule" Observation
V. Developing and handling sheet film	F. Controlling the image 1. Perspective 2. Overlap 3. Focal length 4. Plane of focus G. Exposure 1. Review of basics of exposing control 2. Reciprocity a. adherance to... b. deviations from... 3. Bellows extension factors a. exposure increase $\frac{(\text{Bellows length})^2}{(\text{Focal length})^2}$ = Bellows Factor b. table of Bellows Factor versus stop increases 4. Calumet's "2 inch rule"				I. The student will be able to load film holders, polaroid back, or roll film holders into the view camera and make exposures Observation J. The student will be able to develop sheet film using both tank techniques, as well as tray techniques Observation of procedures and final developed film
VI. Caring, maintenance and storage of view camera and accessories	H. Loading and handling sheet film 1. Loading film holders 2. Identifying emulsion codes 3. Developing sheet film a. tray developing b. tank developing 4. Storing sheet film				

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	I. Sequences of operations 1. Set up and zeroing of all movements 2. Opening lens 3. Focusing a. with cloth b. critical focusing c. with video attachments 4. Composing 5. Closing lens 6. Exposure checks 7. Loading film 8. Exposing film 9. Special care				

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Seeing and perceiving color II. Creating white light by using additive color sources	A. Color perception 1. Physiological aspects 2. Psychological aspects 3. Scientific aspects B. Color vision 1. The retina 2. Rods 3. Cones 4. Optic nerve 5. Electromagnetic spectrum revisited - visible light a. short wave b. long wave C. Building blocks 1. Primary colors for opaque mediums 2. Additive primary colors for photography a. fractional portions blocked by additive colors b. Stacking additive filters c. additive color printing 3. Subtractive primary colors for photography a. fractional portions blocked by subtractive colors b. additives passed by subtractive pairs c. stacking subtractive filters d. neutral density	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	Whole numbers and fractions 1. Functions of additive filters and filter pairs 2. Functions of subtractive filters and filter pairs	A. Biology - anatomy and physiology 1. Perceptions of color 2. Color vision a. retina b. optic nerve c. rods d. cones B. Physics 1. Additive colors 2. Subtractive colors 3. Electromagnetic spectrum	A. The student will be able to demosntrate his/her knowledge of color theory including the means by which color is seen and perceived Written test B. The student will be able to draw charts of both the additive and subtractive primaries showing the resulting mixes by overlapping primaries; these charts shall be colored with pens or markers and be of display quality Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
	A. Structure of film 1. Cross section 2. Emulsions and respective sensitivities 3. Filter separators 4. Base 5. Anti-halation backing 6. Color couplers B. Exposure and development 1. Sensitivity to light 2. Silver halides 3. Conversion to silver 4. Triggering dye development a. color couplers b. color developer 5. Removal of silver image 6. Resultant dyed image 7. Transmission of light C. Printmaking 1. Exposure of paper a. sensitivity to light b. silver image to dyed image c. viewing by reflected light d. effects of dyed layers on light transmission 2. Correcting final color through filtration in enlarger	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions D. Oral communications E. Test taking skills F. Note taking skills	Whole numbers and fractions - functions of subtractive filters and filter pairs	Chemistry 1. Chromogenic process 2. Emulsion characteristics	A. The student will be able to demonstrate his/her knowledge of the structure of color film, color paper and dye development Written test B. The student will be able to draw cross sectional representations of film - both exposed and developed, enlarger projection through that film, and exposure and development of paper image; this chart shall be completely annotated and colored with pens or markers so as to be of display quality Observation

UNIT: COLOR PHOTOGRAPHY - CONTINUED

TOPIC: NEGATIVE DEVELOPING - PROCESS C41

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Mixing chemicals for process C41 II. Developing color negative film with process C41	A. Compatibility of films 1. Different manufacturers 2. Different ASA speeds B. Chemical mixing and handling 1. Developer a. three parts per unit b. two units per kit c. importance of sequence of additions 2. Bleach - three parts per kit 3. Fixer 4. Stabilizer - cautions for handling methanol and formaldehyde C. Development 1. Temperature range - accuracy to within ½°F. 2. Agitation sequences 3. Time chart 4. Changes in developing time (time compensation) a. number of rolls b. film format - calculating area of film stock c. film speed 5. Washing, drying and storage	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Developing chemistry mixing instructions 5. Labels 6. Data sheets D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions - development time calculation B. Interpolation - development time calculation C. Measurement - liquids (metrics) - mixing chemicals	Chemistry - mixing and handling of photographic chemicals	A. The student will be able to demonstrate his/her knowledge of the theory associated with color film negative making Written test B. The student will be able to readily mix chemicals for process C41 Observation C. The student will be able to develop film using process C41 chemicals; time compensation charts shall be employed Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Mixing chemicals for process E6 II. Developing color slide film with process E6	A. Compatibility of films 1. Different manufacturers 2. Different ASA speeds B. Reversal films 1. Reversal accomplished by chemistry (E6) 2. Reversal accomplished by re-exposure (K14) C. Chemical mixing and handling 1. First developer 2. Reversal bath 3. Color developer 4. Conditioner 5. Bleach 6. Fixer 7. Stabilizer 8. Precautions for use and proper storage D. Development 1. Temperature range a. accuracy to within ½° Fahrenheit b. flexibility of some chemicals 2. Agitation sequences 3. Development time changes a. number of rolls b. film format - calculating area of film stock c. film speed 4. Washing, drying, mounting and storage	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Developing chemistry mixing instructions 5. Labels 6. Data sheets D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions - development time calculation B. Interpolation - development time calculation C. Measurement - liquids (metric) - mixing chemicals	Chemistry - mixing and handling of photographic chemicals	A. The student will be able to demonstrate his/her knowledge of the theory associated with color slide film developing Written test B. The student will be able to readily mix chemicals for process E6 Observation C. The student will be able to develop film using process E6 chemicals; time compensation charts shall be used Observation D. The student will be able to readily cut and mount color slides using both plastic mounts and cardboard heat sealed mounts Observation

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Mixing EP2 color chemistry II. Printing from color negatives with EP2 process III. Establishing color corrections of final images	A. Process EP2 - chemicals 1. Mixing 2. Handling 3. Storage 4. Quantities a. developer quantity changes based on process type b. economics B. Exposure of paper C. Processing 1. Tubes or drums 2. Basket processing 3. Tray processing - temperature control a. ambient temperature b. water bath 4. Continuous batch machine processing a. roller transport b. temperature control c. speed control d. dryer control e. filling maching f. adjusting machine g. cleaning and maintaining machine h. troubleshooting i. replenishing D. Viewing prints E. Color corrections	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Developing chemistry mixing instructions 5. Labels 6. Data sheets D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions - development time calculation B. Interoplation - development time calculation C. Measurement - liquids (metric) - mixing chemicals	Chemistry - mixing and handling of photographic chemicals	A. The student will be able to demosntrate his/her knowledge of the theory associated with printing from color negatives Written test B. The student will be able to readily mix chemicals for process EP2 Observation C. The student will be able to make color prints using a continuous feed machine; including replenishing, filling, cleaning and maintaining said machine Observation D. The student will be able to prepare a color-go-round chart to facilitate making color corrections; sequences for exposure and filtration are provided Inspection of final images

UNIT: COLOR PHOTOGRAPHY - CONTINUED

TOPIC: PRINTING FROM SLIDES

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Mixing chemicals for Cibachrome process II. Printing from slides using Cibachrome dye destruction process III. Establishing color corrections of final images	A. Reversal printing B. Cibachrome process 1. Theory a. dye formation b. reversal versus masking c. dye destruction development 2. Advantages versus disadvantages 3. Costs 4. Processing steps a. developer b. bleach c. fixer d. wash 5. Mixing chemistry 6. Disposal of spent chemicals C. Color viewing filters D. Color corrections E. Print storage and handling	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Developing chemistry mixing instructions 5. Labels 6. Data sheets D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions development time calculation B. Interpolation - development time calculation C. Measurement - liquids (metric) - mixing chemicals	Chemistry - mixing and handling of photographic chemicals	A. The student will be able to demonstrate his/her knowledge of the theory associated with printing from color slides Written test B. The student will be able to readily mix chemicals for the Cibachrome process Observation C. The student will be able to make color prints from slides using tray development techniques Observation D. The student will be able to prepare a color-go-round chart to facilitate making color corrections; sequences for exposure/ filtration are provided Inspection of final images

UNIT: COLOR PHOTOGRAPHY - CONTINUED

TOPIC: COLOR BALANCE

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Selecting appropriate light sources for various film stocks II. Selecting appropriate film stock for various light sources III. Balancing film stock to light source	A. Color temperature 1. Theory a. Kevin versus Celsius b. Establishment of °K 2. Practical uses a. 3200°K sources b. 3400°K sources c. 5600°K daylight d. electronic flash e. candlelight 3. Temperatures of the day 4. Cool versus hot colors B. Matching light sources 1. Filtering film at lens 2. Filtering light sources 3. Filtering daylight for shooting indoors 4. Rosco gels 5. Shooting with correct film balance 6. Fine tuning color balance - warming filters C. Color balance versus color correction	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Developing chemistry mixing instructions 5. Labels 6. Data sheets D. Oral communications E. Test taking skills F. Note taking skills G. Graph interpretation H. Chart and tabular data interpretation	A. Whole numbers and fractions development time calculation B. Interpolation - development time calculation C. Measurement - liquids (metric) - mixing chemicals	Chemistry - mixing and handling of photographic chemicals	A. The student will be able to demonstrate his/her knowledge of the theory associated with color filtration, color balance and color correction Written test B. The student will be able to select the appropriate filters for using a film in a light source for which it is not balanced Observation C. The student will be able to select filters for light sources in order to bring them into balance with the type of film being used

UNIT: STUDIO CONSIDERATIONS

TOPIC:

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Determining markets for photographic services II. Producing studio photographs in both color and black and white	A. Types of studios 1. Basic studio 2. Daylight studio 3. Portable studio 4. Specialized studios a. room sets b. car photography 5. Processing lab on a. advantages b. disadvantages 6. Print finishing B. Identifying objectives and determining market C. Still life photography 1. Lighting silverware 2. Lighting glassware 3. Lighting food 4. Props 5. Accessories 6. Scale model photography 7. Background projection 8. Special effects and techniques 9. Multiple exposures 10. In-camera masking D. Glamour photography E. Portrait photography F. Pet photography G. Copying H. Fashion photography I. Types of studio camers 1. Medium format roll film cameras 2. Large format view camers	A. Vocabulary - terminology B. Spelling 1. Vocabulary 2. Written test 3. Class notes C. Functional reading skills 1. Class notes 2. Reprints from reference articles 3. Studio manuals 4. Homework assignments - essays on composition and aesthetics D. Oral communications E. Test taking skills F. Critiquing 1. Work of others 2. Self promotion			A. The student will be able to demonstrate his/her knowledge of the theory associated with studio photography Written test B. The student will be able to list the features, requirements, equipment needs, advantages and disadvantages of the various types of studios Observation C. The student will be able to execute a series of photographs that illustrate all the various types of studio photography; these photographs shall be mounted for display Critiquing of final images D. The student will be able to select a published image from one of the industry source books and replicate that shot as accurately as possible in the sudio during one class period; prior approval of the shot is necessary; the final image must be submitted for evaluation along with a copy of the published image that was used as an example Critiquing of final images

UNIT: STUDIO CONSIDERATIONS - CONTINUED

TOPIC:

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
					E. The student will be able to produce a studio shot of a selected group of related items; the items are supplied by the teacher on the day of the shoot and the entire shot is conducted in a private studio; film produced is confiscated until all students have created their images; the student shall mount the photograph and submit it in a "competition environment" Critiquing of final images

UNIT: PORTFOLIO PRODUCTION

TOPIC:

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Determining the style, content and format for the portfolio II. Preparing the photographic portfolio	A. Self promotion concepts 1. Presentation of essays on photographic philosophy 2. Portfolio shots of professionals 3. Field trips to studios 4. Guest speakers on motivation and philosophy B. The portfolio 1. Quantity 2. Types of case 3. Mounting style 4. Subject content 5. Color versus black and white 6. Transparencies 7. Adhering to specified format C. The market and its impact on portfolio production 1. Studio photographers 2. Industrial/commercial market 3. Freelance 4. Photojournalistic 5. Stock photography	A. Functional reading skills 1. Essays on self promotion philosophies 2. Reproductions of reference articles B. Oral communications C. Critiquing 1. Work of others 2. Self promotion			After exposure to a wide range of portfolio possibilities and philosophies, the student will be able to determine the appropriate format, size and content of their chosen portfolio and then prepare a completed self promotion portfolio of their best work Critiquing of completed portfolios by instructor, classmates and guest photographers

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Identifying career options	A. Further education 1. Trade and technical schools 2. College level photography schools a. two year non-degree b. two year associates degree c. four year bachelors degree 3. Military training 4. On-the-job training - apprenticeships B. Opening your own business 1. Operating freelance 2. Opening home studio 3. Wedding and on-location portrait business C. Photographic labs 1. Mini-labs 2. Custom printing D. Careers in retailing E. Photographic assisting F. Stock photography G. Fine arts photography H. Calendar and greeting card market I. Craft market and mail shows J. Resume writing	A. Functional reading skills 1. Career related material 2. Reproduction of reference articles B. Oral communications C. Resume skills 1. Letter writing 2. Spelling 3. Vocabulary D. Test taking skills			A. The student will be able to produce a typewritten resume containing any information pertinent to securing employment Observation B. The student will be able to demonstrate his/her knowledge of career and training options Written test

UNIT: FILM ANALYSIS

TOPIC:

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Analyzing the impact, structure, content and methodology of cinema	A. The art of film B. Structure of film C. Thematic impact D. Cinematic impact E. Directorial impact F. Acting impact G. Role of sound H. Exploration of film editing 1. Scene by scene analysis 2. Positioning of camera 3. Positioning of actors/ actresses 4. Difference between still and kinetic imaging 5. Transitional devices I. Film as entertainment versus artistic expression 1. Role of television 2. Society impact J. Film genre	A. Vocabulary - terminology B. Spelling 1. Vocabulary 2. Written film analysis papers C. Functional reading skills - reprints of film reviews D. Oral communications E. Note taking skills F. Essay writing 1. Paragraphing 2. Syntax 3. Ideas 4. Format			A. The student will be able to discuss the items under consideration for each film viewed Oral group discussion B. After viewing each film and participating in either a pre-viewing or post-viewing discussion, the student will be able to complete a written analysis of that film; sometimes this analysis is technical in nature and sometimes thematic or a combination of aspects 1. Written evaluation 2. Commenting on student papers C. The student will be able to chart each shot of a full length feature film; this chart shall show camera angle, type of shot, transistional device used, shot content, dialogue and action on screen Written review

UNIT: VIDEO PRODUCTION

TOPIC: VIDEO RECORDING AND PLAYBACK

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Operating a single camera video recording system II. Recording and playing back both audio and video signals with a video tape recorder	A. The television process 1. Image formation 2. Image structure 3. Image transmission 4. Image reception B. The television camera 1. History 2. Operation a. footcandles b. image viewing c. controls 1.1 zoom 1.2 focus 1.3 gain 1.4 aperture 1.5 color balance - white and black, and registration d. electron scanning 3. Cameras versus camcorders C. The television monitor 1. Image display 2. Image reception a. radio frequency (RF) b. composite video c. combinations 3. Electron gun D. Video tape recording 1. Magnetic theory 2. Tape structure 3. Recording a signal 4. Storing information 5. Retrieving information 6. Helical scanning 7. Quadruplex scanning 8. Synchronization (sync) a. straight track b. helical scanning c. EIA and EIAJ sync E. Camera movements 1. Tilts 2. Pans 3. Trucks 4. Dollys 5. Zooms 6. Fades	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocabulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Equipment use manuals D. Oral communications E. Test taking skills F. Note taking skills		Physics - electricity and magnetism 1. Electron scanning 2. Field effect transistors 3. Pickup tubes a. vidicon b. orthocon c. newvicon 4. Cathode ray tube a. electron gun b. phosphorescent coating c. beam projection 5. Synchronization 6. Magnetic recording and playback a. stationary heads b. rotating heads 1.1 quadruplex 1.2 helical scan 7. Gain controls 8. Electron gun registration and display 9. Modulators 10. Radio frequency 11. Radio transmission and reception	A. The student will be able to demonstrate his/her knowledge of the fundamentals associated with the television signal, information storage and retrieval and other aspects of this unit Written test B. The student will be able to set up a video system for recording, make a recording and playback said segments Observation C. The student will be able to balance a video camera prior to use; this shall be done on both studio type and portable video cameras Observation D. The student will be able to clean and maintain the entire video system Observation E. The student will be able to utilize all the camera movements in a smooth professional style Observation

UNIT: VIDEO PRODUCTION - CONTINUED

TOPIC: VIDEO EDITING

Task	Theory	Communication Skills	Mathematics Skills	Science Knowledge	Student Outcome
I. Performs video edits on open reel video tape recorders II. Performs editing on microprocessor based control units III. Prepares scripts for video production IV. Records audio for video production	A. Electronic editing 1. History a. stop/start b. crash c. capstan servo d. vertical interval switching e. flying erase heads 2. Stopwatch backspace editing 3. Time code editing 4. Microprocessor based control units 5. Function of control track B. Types of edits 1. Assemble edits 2. Sound dubbing 3. Insert edits a. video only b. video and audio c. audio only 4. A-B roll editing C. Transitional devices 1. Cuts 2. Fades 3. Dissolves 4. Superimpositions 5. Keyed effects D. Script considerations for editing E. Audio for video recording 1. Microphones a. dynamic b. crystal c. condenser 2. Audio record/playback heads 3. Audio erase heads 4. Speaker operation	A. Vocabulary 1. Nomenclature 2. Terminology B. Spelling 1. Vocablulary 2. Written questions C. Functional reading skills 1. Class notes 2. Textbook chapter 3. Homework questions 4. Equipment use manuals 5. Editing scripts 6. Shooting scripts D. Oral communications E. Test taking skills F. Note taking skills	Whole numbers and fractions - editing times 1. Addition and subtraction of minutes 2. Addition and subtraction of seconds	Physics - electricity and magnetism 1. Magnetic fields 2. Recording signals a. video b. sync c. audio 3. Audio signals a. microphones 1.1 crystal 1.2 dynamic 1.3 condenser b. line level versus microphone level c. speakers	A. The student will be able to demonstrate his/her knowledge of the fundamentals associated with electronic editing Written test B. The student will be able to perform edits on a ½" open reel video tape recorder using the stopwatch backspacing system Observation C. The student will be able to perform assemble edits and insert edits on ½" VHS video systems using a microprocessor based control unit Observation D. The student will be able to perform tape logging operations in preparation for editing Observation E. The student will be able to perform video recording incorporating the required transitional devices for post production Observation